

CAS-SOP #4.7.1

Linking treatment tables: chemotherapy, tumour resections, and radiotherapy

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The NDRS includes:

- The National Cancer Registration and Analysis Service (NCRAS); and

- The National Congenital Anomaly and Rare Disease Registration Service (NCARDRS).

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* understand cancer, rare diseases and congenital anomalies;
* improve diagnosis;
* plan NHS services;
* improve treatment;
* evaluate policy;
* improve genetic counselling.



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1. Introduction

**This Standard Operating Procedure (SOP) (v4.7) updates the previous version (v4.6). This version improves the definition of skin cancer tumours and now includes all Basal Cell Carcinoma (BCC) and cutaneous Squamous Cell Carcinoma (cSCC) genital tumours. This version also updates the previous SOP (v4.6) to include tumours diagnosed in 2019. The changes to the code are summarised in Appendix 1 of this document. ICD10 codes are included in Appendix 2 and updated resection procedure codes are provided in Appendix 3.**

**A small number of tumour resection procedures were identified as missing from April 2019 onwards in the 2013-2019 treatment data published on the 9th June 2022. This resulted in a reduction in the proportion of tumours reported as receiving tumour resection procedures from April 2019 onwards. This effect was usually no more than a 2% reduction, but was greater for non-melanoma skin cancers. The 2013-2019 treatment data was refreshed on the 9th March 2023, rectifying the missing surgery events. Updates to this SOP version (4.7.1) have been made to reflect the data snapshots used to extract this refreshed data. See additional note within Appendix 1.**

The purpose of this SOP is to describe the method of linking treatment tables to the cancer registration data in the Cancer Analysis System (CAS). This allows basic treatment flags to be created; recording whether there was chemotherapy, tumour resection, or radiotherapy recorded following cancer diagnosis. This method was used for NCRAS publications of treatment work including the workbook ‘Chemotherapy, Radiotherapy and Tumour Resections in England, 2013 – 2015’ (available [here](http://www.ncin.org.uk/cancer_type_and_topic_specific_work/topic_specific_work/main_cancer_treatments)) and the ‘Chemotherapy, Radiotherapy and Tumour Resections in England, 2013-2019’ tool available on [CancerData](https://www.cancerdata.nhs.uk/treatments).

The cancer sites included are the 30 sites which have pre-defined lists of relevant tumour resection procedures. All other sites are grouped under either ‘other malignant’ or ‘other non-malignant’ tumours. The term ‘tumour resection’ (previously termed ‘major resection’ in other outputs) is used to describe surgical attempts to remove the primary tumour. This SOP replaces the previous method used to count tumour resections (available [here](http://www.ncin.org.uk/about_ncin/major_resections)).

Cancer site and treatment-specific timeframes have been adopted to strike a balance between including as many treatments as possible carried out as part of the patient’s first course of treatment for that tumour, while minimising the inclusion of treatments for recurrent tumours.

This SOP is to be used where the analyst wishes to extract data on treatments among cancer sites listed in Appendix 2. The cancer sites with a tumour resection flag have been chosen because they are solid tumours (so are potentially resectable); are commonly diagnosed; and input from a site-specific clinician was available. Expansion of this list to include more cancer sites, where resection is a treatment choice, will be considered for future NCRAS work. Chemotherapy and radiotherapy data was available for all cancer sites. This SOP exists to set a standard that can be followed to produce uniform and replicable results and in particular for external requests for treatment data received via the NHS Digital Data Access Request Service (DARS) (previously the Office for Data Release (ODR)). Certain specific uses may require a different approach and should be discussed with the lead of the therapeutics functional team.

The specific procedure codes used to select tumour resections are listed in Appendix 3. The SQL script which accompanies this SOP is in Appendix 4. The SQL code produces tumour-level data with 3 treatment flags (chemotherapy [CT], tumour resection [SG] and radiotherapy [RT]), with 0 as no treatment and 1 where treatment is present.

# Method

## Cohort definition

Cancer registry data from AT\_TUMOUR\_ENGLAND is used as the base to identify the cohort of patients. All patients diagnosed with malignant cancer, benign endocrine tumours, and non-malignant brain tumours in England in 2013-2019 were included. Males with gynaecological cancer and females with prostate cancer were excluded. Death certificate only registrations are included (0.8% of the cohort).

## Overall approach to identify treatments

The datasets used to collate treatment data are AT\_TREATMENT\_ENGLAND, SACT (Systemic Anti-Cancer Therapy), RTDS (RadioTherapy DataSet), and inpatient (Admitted Patient Care (APC)) HES (Hospital Episode Statistics). The AT\_TREATMENT\_ENGLAND table is linked at tumour level, based on registration staff linking tumours to recorded treatments. Appendix 5 details the datasets and Snapshots used in this update.

The scope of this SOP is tumours diagnosed from 2013 onwards as it is known that the data quality in AT\_TREATMENT\_ENGLAND and SACT is lower before this point. However, treatment flags for select groups (e.g. childhood cancers) may be fairly complete in AT\_TREATMENT\_ENGLAND for earlier years. Cancer Waiting Times (CWT) data is not currently used. This decision was made following an assessment of the coverage of the datasets, and as ≥98% of radiotherapy and ≥94% of chemotherapy were captured by registry, SACT and RTDS in the period October 2012 to March 2013 (with the data completeness believed to be increasing since) it did not justify the complication of including CWT data.

For patients with one tumour diagnosed in 2013-2019, and those patients with multiple tumours diagnosed more than eighteen months apart, data from both the tumour linked treatment table (AT\_TREATMENT\_ENGLAND) and the patient linked treatment tables (SACT, RTDS and HES) are used. However, for patients with two or more tumours diagnosed within eighteen months of each other, only data from the tumour linked treatment table (AT\_TREATMENT\_ENGLAND) is used. This is because for the patient linked tables, the precise tumour that a treatment relates to is not identified, only the person. The current scope of this SOP is to define a working methodology for counting treatments in the absence of tumour level linked data, i.e., currently SACT, RTDS and HES data are linked at patient level and while the tumour that any treatment data applies to (where a patient has multiple tumours) can be inferred it is not definitively linked. This may be modified as and when further tumour-linked treatment data becomes available.

Tumours which received the same treatment more than once are only counted once.

## Early stage tumour resections

Previous resections work relied upon lists of procedure codes (OPCS-4 codes) which would be used to remove the primary tumour (available [here](http://www.ncin.org.uk/about_ncin/major_resections)). These lists were defined in consultation with experienced clinicians. Lack of data on stage at diagnosis at the time of definition meant that the lists were conservative, and each code would apply across all tumours of that particular site regardless of stage. Now that high quality stage at diagnosis data is available for most sites, the list of OPCS-4 procedure codes used to define tumour resections has been adapted to include tumour resections for early stage tumours. Site-specific clinicians were consulted for the 30 sites included in the original major resection list, and stage-specific rules have now been incorporated for relevant sites (cervical, colon, rectum, bladder, liver, oesophageal and stomach cancers).

In addition to the existing tumour resection list, the following procedures were identified as tumour resections in early stage disease only:

|  |  |
| --- | --- |
| Cervical | Cone biopsies for FIGO stage 1a tumours, and also those with stage 1b & 1b1 disease if the patient also had a lymphadenectomy |
| Colon and rectum | Endoscopic resections and endoscopic biopsy procedures for TNM stage 1 tumours |
| Bladder | Endoscopic resections, destructions, and cauterisation of lesion of bladder (TURBT) and other specified endoscopic extirpation of lesion of bladder for T1 (non-muscle invasive) tumours |
| Liver | Percutaneous radiofrequency and microwave ablation of lesion of liver for TNM stage 1 tumours |
| Oesophagus | Fibreoptic endoscopic resection of lesions of upper gastrointestinal tract and oesophagus for TNM stage 1a tumours |
| Stomach | Fibreoptic endoscopic resection of lesion of upper gastrointestinal tract and oesophagus for TNM stage 1a tumours |

In addition, after clinical review certain OPCS-4 codes were added to or removed from the previous list for all stages of disease. For more information, see Appendix 3, and Appendix 6 for a sensitivity analysis showing the impact of adding stage-specific tumour resections.

## Timeframe

NCRAS follows European Network of Cancer Registries (ENCR) rules to define the date of diagnosis. This may be sourced from several data items including the date of the first pathological report confirming the tumour (although the date the pathological sample was taken is preferred, if available). This means that date of diagnosis can be shortly after a surgical resection. To avoid excluding relevant data, treatments in the one month (-31 days inclusive) prior to diagnosis were included in the analysis.

A data-driven approach with additional input from site-specialist clinicians was used to decide a site- and modality- specific post-diagnosis timeframe. The timeframe was chosen to be long enough to capture as many treatments as possible as part of the patient’s primary course of treatment, while also minimising the inclusion of treatments for recurrence. This SOP counts treatments between one month before, to up to eighteen months after diagnosis, with the exact timeframe depending on the site and treatment type. For patients who received each treatment for each cancer, the number of days after diagnosis at which 95% of these patients received the treatment was identified. This was rounded up to the nearest threemonth interval, and this timeframe cut off was applied. Post-diagnosis timeframes were therefore 6, 9, 12, 15 or 18 months. The timeframes were based on 2013 and 2014 data only, because of the length of follow-up data required.

For example, of the pancreatic tumours diagnosed in 2013-14 which received a tumour resection within two years of diagnosis, 95% had their resection within 226 days. Therefore for all pancreatic cancers diagnosed in 2013-2016, a post-diagnosis tumour resection timeframe of 274 days (9 months) was applied. Exceptions to the data driven approach were made for particular treatments for certain cancer sites under recommendation from clinicians. For these sites, clinicians decided the timeframe using a combination of their own experience and the data. See Appendix 2 for details, and Appendix 7 for a sensitivity analysis showing the impact of changing the timeframes.

Relative to other tumour sites, treatment data quality for non-melanoma skin cancers (NMSC) (BCC, cSCC and rare tumours) is poor. A data-driven approach failed to identify 95% of chemotherapy and radiotherapy treatments within an appropriate timeframe. Clinician input was therefore used to decide suitable timeframes for treatment periods, with the view that quantifying the current state of treatment data can be used as a base to improve overall data quality. These figures should therefore be considered provisional and are expected to be incomplete.

## SQL rules used to identify treatments

In order to match the output from CancerStats, the cascade\_inci\_flag (from the registry AT\_TUMOUR\_ENGLAND base table) must equal 1 (refer to the standard operating procedure “CAS-SOP #1: Counting Cancer Cases” for further information on this, available on request to NCRAS). This SOP applies to CAS 1612 onwards, as it uses the newly categorised treatments implemented in December 2016.

## Chemotherapy

A tumour is recorded as treated with chemotherapy if:

* there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with chemotherapy (event is either 'Cytotoxic Chemotherapy' (code = 02) or 'CT - Other' (code = CTX) or ‘chemoradiotherapy’ (code = 04) or ‘radioisotope therapy (including radioiodine)’ (code = 19) or 'Immunotherapy' (code = 15))
* and the event date (EVENTDATE) occurred in the relevant timeframe (see Appendix 2)

OR

* there is a record in SACT (excluding those null or classified as 'Hormones' or 'Not chemo' or 'Zoledronic acid' or 'Pamidronate' or 'Denosumab')
* and the start date of the regimen (START\_DATE\_OF\_REGIMEN) occurred in the relevant timeframe
* and the patient had no other tumours diagnosed in the 18 months before or after that tumour’s diagnosis date

SACT is linked to cancer registration where NHS numbers are a perfect match. Regimen mappings are based on both those directly confirmed by trusts, and those assigned by the SACT team (for example where trusts haven’t addressed unmapped regimens).

## Tumour resections

A tumour is recorded as treated by resection if:

* there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or ‘01c’)
* and the OPCS4\_CODE is in the tumour resection list
* or the OPCS4\_CODE is identified as a tumour resection in early stage tumours for that specific cancer site (see Appendix 3)
* and the operation date (OPERTN) occurred in the relevant timeframe (see Appendix 2)

OR

* there is an inpatient HES episode with a tumour resection OPCS-4 code in one of the operation fields
* or one of the operation fields contains an OPCS-4 code identified as a tumour resection in early stage tumours for that specific cancer site (see Appendix 3)
* and the operation date (OPERTN) occurred in the relevant timeframe
* and the patient had no other tumours diagnosed in the 18 months before or after that tumour’s diagnosis date

HES is linked to the cancer registration using a matching algorithm taking into account NHS number, date of birth, sex and postcode at diagnosis (details available on request to NCRAS).

## Radiotherapy

A tumour is recorded as treated with radiotherapy if:

* there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with radiotherapy (event is either 'RT - Teletherapy' (code = 05) or ‘chemoradiotherapy’ (code = 04) or ‘radiosurgery’ (code = 22) or 'RT - Other/ NK' (code = RTX))
* and the event date (EVENTDATE) occurred in the relevant timeframe (see Appendix 2)

OR

* there is a record in RTDS (excluding those classed as Brachytherapy, i.e., with RTTREATMENTMODALITY='06')
* and the appointment date (APPTDATE) occurred in the relevant timeframe
* and the patient had no other tumours diagnosed in the 18 months before or after that tumour’s diagnosis date

RTDS is linked to the cancer registration using a matching algorithm taking into account NHS number, date of birth, sex and postcode at diagnosis (details available on request to NCRAS). Brachytherapy was excluded from the definition of radiotherapy because further investigation into its completeness is needed first. Radiotherapy figures are likely to be an underestimate as there is underreporting of teletherapy in both RTDS datasets, and data may be incomplete for selected NHS Trusts.

From 1 April 2016, PHE took over full responsibility for RTDS, allowing greater integration of the management, collection, quality assurance and analysis of radiotherapy data alongside the other major national cancer data sets in its charge. For patients whose follow up period for radiotherapy extended past April 2016, the RTDS.AT\_PRESCRIPTIONS dataset in CAS2211 was used.

## Results breakdowns

Results are broken down by 30 tumour sites; the ICD-10 codes used to define these can be found in Appendix 2. Definitions for skin cancer can be found in the CAS\_SOP\_CountingSkinCancer\_2.0.

Stage breakdowns in the data release use TNM staging, except for gynaecological cancers which use Figo staging. For cervical cancers, only FIGO staging was used. For ovarian, uterine and vulval cancers, TNM stage was used where Figo stage was unknown. Figo substages were collated into Figo stages 1, 2, 3, 4, and unknown. To remain consistent with published stage data, Breast tumours (C50) with Paget’s disease were excluded. The final recorded stage of a tumour is derived by the registration service using all information available up to 3 months after diagnosis. For this reason, the tumour stage shown in this data may be different to the stage originally available to the clinician when deciding a course of treatment, as it may have been subsequently updated following removal of the tumour and pathology results.

The patient’s age group was based on the age of the patient when they were diagnosed with the tumour.

The patient’s income deprivation quintile was allocated by linking the patient’s postcode to their 2011 ONS census Lower Super Output Area (LSOA). This was then linked to the Ministry of Housing, Communities & Local Government English Indices of Deprivation 2019 deprivation quintile for that LSOA.

The patient’s Charlson comorbidity score was derived from Hospital Episodes Statistics (HES) and Cancer Registry data combined and looks back at the time period between 27 months to 3 months before the patient’s cancer diagnosis.

The patient’s Cancer Alliance was allocated based on their Cancer Alliance of residence at point of diagnosis, not the location(s) where they were treated.

# Appendix 1: Code changes in SOP version 4.7 compared to 4.6

Changes have been made to the extraction code in SOP version 4.7 since SOP version 4.6 was published for 2013-2018 diagnoses. These are noted below. Only non-superficial changes are noted; i.e. changes that could potentially impact the results.

## Timeframe lookup table

No changes have been made to the timeframe lookup tables since SOP version 4.6.

## Tumour cohort table

The definitions for non-melanoma skin cancers (NMSC) have been updated. NMSC are now selected from the AT\_TUMOUR\_SKIN table. For full details about the definition of NMSC (BCC, cSBCC, rare) please refer to CAS\_SOP\_CountingSkinCancer\_2.0.

* NMSC: BCC: Includes all BCC genital tumours and first ever registered non-genital BCC tumours following UKIACR method.
* NMSC: cSCC: Includes all cSCC genital tumours and first ever registered non-genital cSCC tumours following UKIACR method.
* NMSC: Rare: Includes all registered rare NMSC tumours.
* Vulval tumours (C51) are no longer in their own category and are now included within skin tumours.
* The Snapshot used for AT\_TUMOUR\_ENGLAND and AT\_TREATMENT\_ENGLAND was updated to AV2019 (CAS2109).

## Chemotherapy flag

The Snapshot used for AT\_TREATMENT\_ENGLAND was updated to AV2019 (CAS2109).

## Tumour resection flag

Resection codes were added for small cell and non-small cell lung cancers to align with the ‘Lung cancer clinical outcomes publication 2019 (for the audit period 2017)’, Additional resection codes were also added for skin cancers. See appendix 3 for a complete list of resection codes used.

## Radiotherapy flag

## The Snapshots used for AT\_TREATMENT\_ENGLAND and for the RTDS dataset post April 2016 were updated to AV2019 (CAS2109).

## Index of Deprivation

Historically NCRAS have used equal population-weighted income domain quintiles to assess deprivation. This method is limited in that income by itself may not give a full reflection of deprivation. After a recent review NCRAS will now use the ‘index of multiple deprivation’ (IMD) to assess deprivation, which is in line with the rest of the public health world. The IMD looks at six categories:

1. Employment deprivation
2. Education, skills and training deprivation
3. Health deprivation and disability
4. Crime
5. Barriers to housing and services
6. Living environment deprivation

Quintiles in the IMD are equally weighted by Lower Layer Super Output Areas (LSOAs) where 1 is the most deprived quintile and 5 the least.

The deprivation measure (IMD19\_QUINTILE\_LSOAS) in this version of the treatment flags table therefore uses the IMD equal LSOA weighted deprivation measures where quintile 1 is the most deprived and quintile 5 this least. This replaces the use of equal population-weighted income domain quintiles, where 1 is the least deprived quintile and quintile 5 the most deprived, used in previous versions.

***The extraction code was re-executed since the original publication of SOP 4.7 using more recently available HES data. This was because a small number of tumour resection procedures were identified as missing from April 2019 in the 2013-2019 data publication. This issue now been resolved and this SOP (4.7.1) accompanies the updated 2013-2019 data publication (released on the 9th March 2023). The only changes in the code between v4.7 and v4.7.1 were to use SACT and RTDS data from cas2211 rather than cas2204 (as cas2204 was no longer available at the time of re-extraction).***

# Appendix 2: Summary of tumour sites & timeframe rules

|  |  |  |
| --- | --- | --- |
|  |  | Days included as post-diagnostic time period (months) |
| Cancer site | ICD10 codes | Chemotherapy | Tumour resections | Radiotherapy |
| Bladder | C67 | 365 (12) | 274 (9) | 365 (12)\* |
| Brain: Benign endocrine ^ | D35.2-D35.4 | 547 (18) | 365 (12) | 547 (18) |
| Brain: Malignant brain,  | C70-72 | 547 (18) | 183 (6) | 365 (12) |
| Brain: Non-benign endocrine | C75.1-C75.3 D44.3-D44.5  | 547 (18) | 183 (6) | 365 (12) |
| Brain: Non-malignant brain ^ | D32-D33, D42-D44.5 | 547 (18) | 365 (12) | 547 (18) |
| Breast | C50 | 365 (12)\* | 365 (12)\* | 365 (12)\* |
| Cervical | C53 | 274 (9)\* | 274 (9)\* | 274 (9)\* |
| Colorectal: Colon | C18-19 | 365 (12)\* | 183 (6)\* | 365 (12)\* |
| Colorectal: Rectum | C20 | 365 (12)\* | 365 (12)\* | 365 (12)\* |
| Hypopharynx | C12, C13 | 183 (6) | 365 (12) | 183 (6) |
| Larynx | C32 | 365 (12) | 456 (15) | 183 (6) |
| Oral cavity | C02, C03, C04, C06 | 456 (15) | 183 (6) | 456 (15) |
| Oropharynx | C01, C09, C10 | 183 (6) | 365 (12) | 183 (6) |
| Other head and neck | C05, C11, C14, C30, C31 | 365 (12) | 456 (15) | 274 (9) |
| Salivary glands | C07, C08 | 547 (18) | 183 (6) | 274 (9) |
| Kidney | C64-C66, C68 | 365 (12)\* | 183 (6) | 365 (12)\* |
| Liver | C22 | 456 (15) | 365 (12) | 547 (18) |
| SCLC | C33-C34 with ICD-O-2 morphology in list 8041, 8042, 8043, 8044, 8045 | 183 (6)\* | 183 (6)\* | 183 (6)\* |
| NSCLC | C33-C34 with ICD-O-2 morphology not in list 8041, 8042, 8043, 8044, 8045 | 183 (6)\* | 183 (6)\* | 183 (6)\* |
| Oesophagus | C15 | 183 (6) | 274 (9) | 274 (9)\* |
| Ovary | C56-C57, C48 (females, excluding ICD-O-2 8693, 8800-8806, 8963, 8990, 8991, 9040-9044, 8810-8921, 9120-9373, 9490, 9500, 9530-9582), D39.1 | 274 (9)\* | 274 (9)\* | 274 (9)\* |
| Pancreas | C25 | 183 (6) | 274 (9) | 547 (18) |
| Prostate | C61 | 365 (12)\* | 456 (15) | 365 (12)\* |
| Skin: Melanoma  | C43 | 456 (15) | 183 (6) | 547 (18) |
| Skin: NMSC BCC^ | First ever BCC registration and all BCC genital tumours  | 547 (18) | 365 (12) | 547 (18) |
| Skin: NMSC cSCC^  | First ever cSCC registration and all cSCC genital tumours | 456 (15) | 183 (6) | 547 (18) |
| Skin: Rare^  | All registered rare tumours | 456 (15) | 183 (6) | 547 (18) |
| Stomach | C16 | 183 (6) | 274 (9) | 274 (9)\* |
| Testis | C62, D29.2 | 274 (9) | 183 (6) | 547(18) |
| Uterine | C54-C55 | 274 (9)\* | 274 (9)\* | 274 (9)\* |
| Other malignant neoplasms | C00, C17, C21, C23-C24, C26, C37-C42, C45-C48, non-ovarian C48, C49, C52, C58-C60, C63, C69, C75.0, C75.4-C97  | 456 (15) | N/A | 547 (18) |
| Other non-malignant neoplasms | D00, D02, D05, D09-D10, D12, D14, D17, D19-D24, D26, D28, D30, D31, D34, D35.0-D35.1, D35.5-D35.9, D37-D38, D41, D44.0-D44.2, D44.6-D44.9, D45-D47  | 456 (15) | 183 (6) | 547 (18) |

The following ICD 10 codes and post-diagnostic treatment time periods were used for the cancer sites presented in this workbook. The time periods were identified using a data driven approach detailed in CAS-SOP #4.4, with exceptions (\*) made for particular treatments for certain cancer sites under recommendation from clinicians. These timeframes were chosen by clinicians using their own experience and the data.

^ Please refer to the CAS\_SOP\_CountingSkinCancer\_2.0 SOP for full details on how non-melanoma skin cancers (NMSC) are defined.

# Appendix 3: Site-specific summary of tumour resection rules

|  |  |  |
| --- | --- | --- |
| OPCS-4 code | Procedure name | Notes |
| Bladder (C67) |   |
| M421 | Endoscopic resection of lesion of bladder | Non muscle invasive (T1) tumours only  |
| M422 | Endoscopic cauterisation of lesion of bladder | Non muscle invasive (T1) tumours only. |
| M423 | Endoscopic destruction of lesion of bladder NEC | Non muscle invasive (T1) tumours only |
| M428 | Other specified endoscopic extirpation of lesion of bladder | Non muscle invasive (T1) tumours only |
| M429 | Unspecified endoscopic extirpation of lesion of bladder | Non muscle invasive (T1) tumours only |
| M341 | Cystoprostatectomy |  |
| M342 | Cystourethrectomy |  |
| M343 | Cystectomy NEC |  |
| M344 | Simple cystectomy |  |
| M348 | Other specified total excision of bladder |  |
| M349 | Unspecified total excision of bladder |  |
| M359 | Unspecified partial excision of bladder |  |
| X142 | Anterior exenteration of pelvis |  |
|  |  |  |
| Brain (C70-C72, C75.1-C75.3) |  |
| A011 | Hemispherectomy |
| A012 | Total lobectomy of brain  |
| A013 | Partial lobectomy of brain  |
| A018 | Other specified major excision of tissue of brain  |
| A019 | Unspecified major excision of tissue of brain  |
| A021 | Excision of lesion of tissue of frontal lobe of brain |
| A022 | Excision of lesion of tissue of temporal lobe of brain  |
| A023 | Excision of lesion of tissue of parietal lobe of brain  |
| A024 | Excision of lesion of tissue of occipital lobe of brain  |
| A025 | Excision of lesion of tissue of cerebellum |
| A026 | Excision of lesion of tissue of brain stem |
| A028 | Other specified excision of lesion of tissue of brain  |
| A029 | Unspecified excision of lesion of tissue of brain  |
| A068 | Other specified other excision of lesion of tissue of brain  |
| A069 | Unspecified other excision of lesion of tissue of brain  |
| A171 | Endoscopic extirpation of lesion of ventricle of brain |  |
| A291 | Excision of lesion of optic nerve (II) |
| A292 | Excision of lesion of oculomotor nerve (III) |
| A293 | Excision of lesion of trigeminal nerve (V) |
| A294 | Excision of lesion of facial nerve (VII) |  |
| A295 | Excision of lesion of acoustic nerve (VIII) |  |
| A296 | Excision of lesion of glossopharyngeal nerve (IX) |
| A297 | Excision of lesion of vagus nerve (X) |
| A298 | Excision of lesion of specified cranial nerve NEC |
| A299 | Unspecified excision of lesion of cranial nerve |
| A381 | Extirpation of lesion of meninges of cortex of brain  |
| A382 | Extirpation of lesion of meninges of sphenoidal ridge of cranium |
| A383 | Extirpation of lesion of meninges of subfrontal region of brain  |  |
| A384 | Extirpation of lesion of meninges of parasagittal region of brain  |  |
| A385 | Extirpation of lesion of falx cerebri  |  |
| A386 | Extirpation of lesion of tentorium cerebelli |
| A388 | Other specified excision of lesion of meninges of brain  |  |
| A389 | Unspecified extirpation of lesion of meninges of brain  |
| A431 | Extirpation of lesion of meninges of skull base  |  |
| A432 | Extirpation of lesion of meninges of skull clivus |  |
| A438 | Other specified other extirpation of lesion of meninges of brain  |  |
| A439 | Unspecified other extirpation of lesion of meninges of brain  |  |
| A441 | Chordectomy of spinal cord |  |
| A442 | Extirpation of lesion of spinal cord NEC |  |
| A443 | Excision of lesion of intradural intramedullary spinal cord NEC |  |
| A444 | Excision of lesion of extradural spinal cord |  |
| A445 | Excision of lesion of intradural extramedullary spinal cord  |  |
| A448 | Other specified partial extirpation of spinal cord |  |
| A449 | Unspecified partial extirpation of spinal cord |  |
| A511 | Extirpation of lesion of meninges of spinal cord |
| A571 | Extirpation of lesion of psinal nerve root  |  |
| A598 | Other specified excision of peripheral nerve |
| A611 | Excision of lesion of peripheral nerve |  |
| B012 | Trans-spenoidal hypophysectomy |  |
| B013 | Trans-septal hypophysectomy |
| B014 | Transcranial hypophysectomy |  |
| B018 | Other specified excision of pituitary gland |  |
| B019 | Unspecified excision of pituitary gland |  |
| B041 | Excision of lesion of pituitary gland  |
| B061 | Excision of pineal gland |
| B068 | Other specified operations on pineal gland  |  |
| C021 | Excision of lesion of orbit |  |
| V051 | Extirpation of lesion of cranium |  |
| V074 | Excision of lesion of infratemporal fossa |  |
| V291 | Primary laminectomy excision of cervical intervertebral disc |
| V312 | Primary anterolateral excision of thoracic intervertebral disc NEC |  |
| V318 | Other specified primary excision of thoracic intervertebral disc |  |
| V319 | Unspecified primary excision of thoracic intervertebral disc |
| V331 | Primary laminectomy excision of lumbar intervertebral disc |  |
| V339 | Unspecified primary excision of lumbar intervertebral disc |  |
| V351 | Primary excision of intervertebral disc NEC |  |
| V431 | Excision of lesion of cervical vertebra |  |
| V432 | Excision of lesion of thoracic vertebra |  |
| V433 | Excision of lesion of lumbar vertebra |  |
| V438 | Other specified extirpaiton of lesion of spine |  |
| V439 | Unspecified extirpation of lesion of spine |
|  |  |
| Breast (C50) |   |
| B271 | Total mastectomy and excision of both pectoral muscles and part of chest wall |
| B272 | Total mastectomy and excision of both pectoral muscles NEC |
| B273 | Total mastectomy and excision of pectoralis minor muscle |  |
| B274 | Total mastectomy NEC |  |
| B275 | Subcutaneous mastectomy |  |
| B276 | Skin sparing mastectomy |  |
| B278 | Other specified total excision of breast  |  |
| B279 | Unspecified total excision of breast  |  |
| B281 | Quadrantectomy of breast  |  |
| B282 | Partial excision of breast NEC |  |
| B283 | Excision of lesion of breast NEC |  |
| B284 | Re-excision of breast margins |  |
| B285 | Wire guided partial excision of breast  |  |
| B286 | Excision of accessory breast tissue |  |
| B287 | Wire guided excision of lesion of breast  |  |
| B288 | Other specified other excision of breast |  |
| B289 | Unspecified other excision of breast  |  |
| B341 | Subareolar excision of mammary duct |  |
| B342 | Excision of lesion of mammary duct |  |
| B343 | Excision of lesion of mammary duct |  |
| B352 | Excision of nipple |  |
| B353 | Extirpation of lesion of nipple |
| B374 | Capsulectomy of breast  |
| B401 | Interstitial laser destruction of lesion of breast  |  |
| B408 | Other specified destruction of lesion of breast  |  |
| B409 | Unspecified destruction of lesion of breast  |  |
|  |  |  |
| Cervical (C53) |   |
| P172 | Partial colpectomy |  |
| Q011 | Amputation of cervix uteri |  |
| Q013 | Excision of lesion of cervix uteri |  |
| Q018 | Other specified excision of cervix uteri |  |
| Q071 | Abdominal hysterocolpectomy and excision of periuterine tissue |  |
| Q072 | Abdominal hysterectomy and excision of periuterine tissue NEC |  |
| Q073 | Abdominal hysterocolpectomy NEC |  |
| Q074 | Total abdominal hysterectomy NEC |  |
| Q078 | Other specified abdominal excision of uterus |  |
| Q079 | Unspecified abdominal excision of uterus |  |
| Q081 | Vaginal hysterocolpectomy and excision of periuterine tissue |  |
| Q082 | Vaginal hysterectomy and excision of periuterine tissue NEC |  |
| Q083 | Vaginal hysterocolpectomy NEC |  |
| Q088 | Other specified vaginal excision of uterus |  |
| Q089 | Unspecified vaginal excision of uterus |  |
| X141 | Total exenteration of pelvis |  |
| X142 | Anterior exenteration of pelvis |  |
| X143 | Posterior exenteration of pelvis |  |
| X148 | Other specified clearance of pelvis |  |
| X149 | Unspecified clearance of pelvis |  |
| Q014 | Large loop excision of transformation zone | Figo stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865) |
| Q031 | Knife cone biopsy of cervix uteri | Figo stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865) |
| Q032 | Laser cone biopsy of cervix uteri | Figo stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865) |
| Q033 | Cone biopsy of cervix uteri NEC | Figo stage 1a only, and stage 1b and 1b1 where also present with a lymphadenectomy code (TT856, T859, T865) |
| T856 | Block dissection of pelvic lymph nodes  | Figo stage 1b and 1b1 where also present with a cone biopsy code (Q014, Q031, Q032, Q033) |
| T859 | Unspecified block dissection of lymph nodes | Figo stage 1b and 1b1 where also present with a cone biopsy code (Q014, Q031, Q032, Q033) |
| T865 | Sampling of mediastinal lymph nodes | Figo stage 1b and 1b1 where also present with a cone biopsy code (Q014, Q031, Q032, Q033) |
|  |  |  |
| Colon and rectum (C18, C19 and C20) |   |
| H041 | Panproctocolectomy and ileostomy |  |
| H042 | Panproctocolectomy and anastomosis of ileum to anus and creation of pouch HFQ |  |
| H043 | Panproctocolectomy and anastomosis of ileum to anus NEC |  |
| H048 | Other specified total excision of colon and rectum |  |
| H049 | Unspecified total excision of colon and rectum |  |
| H051 | Total colectomy and anastomosis of ileum to rectum |  |
| H052 | Total colectomy and ileostomy and creation of rectal fistula HFQ |  |
| H053 | Total colectomy and ileostomy NEC |  |
| H058 | Other specified total excision of colon  |  |
| H059 | Unspecified total excision of colon |  |
| H061 | Extended right hemicolectomy and end to end anastomosis  |  |
| H062 | Extended right hemicolectomy and anastomosis of ileum to colon |  |
| H063 | Extended right hemicolectomy and anastemosis NEC |  |
| H064 | Extended right hemicolectomy and ileostomy HFQ |  |
| H065 | Extended right hemicolectomy and end to side anastomosis |  |
| H068 | Other specified extended excision of right hemicolon |  |
| H069 | Unspecifed extended excision of right hemicolon |  |
| H071 | Right hemicolectomy and end to end anastomosis of ileum to colon |  |
| H072 | Right hemicolectomy and side to side anastomosis of ileum to transverse colon |  |
| H073 | Right hemicolectomy and anastomosis NEC |  |
| H074 | Right hemicolectomy and ileostomy HFQ |  |
| H075 | Right hemicolectomy and end to side anastomosis  |  |
| H078 | Other specified other excision of right hemicolon |  |
| H079 | Unspecified other excision of right hemicolon |  |
| H081 | Transverse colectomy and end to end anastomosis  |  |
| H082 | Transverse colectomy and anastomosis of ileum to colon |  |
| H083 | Transverse colectomy and anastomosis NEC |  |
| H084 | Transverse colectomy and ileostomy HFQ |  |
| H085 | Transverse colectomy and exteriorisation of bowel NEC |  |
| H088 | Other specified excision of transverse colon |  |
| H089 | Unspecified excision of transverse colon |  |
| H091 | Left hemicolectomy and end to end anastomosis of colon to rectum  |  |
| H092 | Left hemicolectomy and end to end anastomosis of colon to colon  |  |
| H093 | Left hemicolectomy and anastomosis NEC |  |
| H094 | Left hemicolectomy and ileostomy HFQ |  |
| H095 | Left hemicolectomy and exteriorisation of bowel NEC |  |
| H098 | Other specified excision of left hemicolon |  |
| H099 | Unspecified excision of left hemicolon |  |
| H101 | Sigmoid colectomy and end to end anastomosis of ileum to rectum |  |
| H102 | Sigmoid colectomy and anastomosis of colon to rectum |  |
| H103 | Sigmoid colectomy and anastomosis NEC |  |
| H104 | Sigmoid colectomy and ileostomy HFQ |  |
| H105 | Sigmoid colectomy and exteriorisation of bowel NEC |  |
| H106 | Sigmoid colectomy and end to side anastomosis |  |
| H108 | Other specified excision of sigmoid colon |  |
| H109 | Unspecified excision of sigmoid colon |  |
| H111 | Colectomy and end to end anastomosis of colon to colon NEC |  |
| H112 | Colectomy and side to side anastomosis of ileum to colon NEC |  |
| H113 | Colectomy and anastomosis NEC |  |
| H114 | Colectomy and ileostomy NEC |  |
| H115 | Colectomy and exteriorisation of bowel NEC |  |
| H118 | Other specified other excision of colon |  |
| H119 | Unspecified other excision of colon |  |
| H291 | Subtotal excision of colon and rectum and creation of colonic pouch and anastomosis of colon to anus |  |
| H292 | Subtotal excision of colon and rectum and creation of colonic pouch NEC |  |
| H293 | Subtotal excision of colon and creation of colonic pouch and anastomosis of colon to rectum |  |
| H294 | Subtotal excision of colon and creation of colonic pouch NEC |  |
| H298 | Other specified subtotal excision of colon |  |
| H299 | Unspecified subtotal excision of colon |  |
| H322 | Hartmann procedure (rectosigmoidectomy) |  |
| H331 | Abdominoperineal excision of rectum and end colostomy |  |
| H332 | Proctectomy and anastomosis of colon to anus |  |
| H333 | Anterior resection of rectum and anastomosis of colon to rectum using staples |  |
| H334 | Anterior resection of rectum and anastomosis NEC |  |
| H335 | Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel |  |
| H336 | Anterior resection of rectum and exteriorisation of bowel |  |
| H337 | Perineal resection of rectum HFQ |  |
| H338 | Other specified excision of rectum |  |
| H339 | Unspecified excision of rectum |  |
| H404 | Trans-sphincteric anastomosis of colon to anus |  |
| H408 | Other specified operations on rectum through anal sphincter |  |
| H409 | Unspecified operations on rectum through anal sphincter |  |
| X141 | Total exenteration of pelvis |  |
| X142 | Anterior exenteration of pelvis |  |
| X143 | Posterior exenteration of pelvis |  |
| X148 | Other specified clearance of pelvis |  |
| X149 | Unspecified clearance of pelvis |  |
| H122 | Excision of lesion of colon NEC | Stage 1 only |
| H181 | Open colonoscopy | Stage 1 only |
| H191 | Open biopsy of lesion of colon | Stage 1 only |
| H201 | Fibreoptic endoscopic snare resection of lesion of colon | Stage 1 only |
| H202 | Fibreoptic endoscopic cauterisation of lesion of colon | Stage 1 only |
| H204 | Fibreoptic endoscopic destruction of lesion of colon NEC | Stage 1 only |
| H205 | Fibreoptic endoscopic submucosal resection of lesion of colon | Stage 1 only |
| H206 | Fibreoptic endoscopic resection of lesion of colon NEC | Stage 1 only |
| H208 | Other specified endoscopic extirpation of lesion of colon | Stage 1 only |
| H209 | Unspecified endoscopic extirpation of lesion of colon | Stage 1 only |
| H221 | Diagnostic fibreoptic endoscopic examination of colon and biopsy of lesion of colon | Stage 1 only |
| H229 | Undpecified diagnostic endoscopic examination of colon | Stage 1 only |
| H231 | Endoscopic snare resection of lesion of lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H232 | Endoscopic cauterisation of lesion of lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H235 | Endoscopic submucosal resection of lesion of lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H236 | Endoscopic resection of lesion of lower bowel using fibreoptic sigmoidoscope NEC | Stage 1 only |
| H238 | Other specified endoscopic extirpation of lesion of lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H239 | Unspecified endoscopic extirpation of lesion of lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H248 | Other specified other therapeutic endoscopic operations on lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H251 | Diagnostic endoscopic examination of lower bowel and biopsy of lesion of lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H259 | Unspecified diagnostic endoscopic examination of lower bowel using fibreoptic sigmoidoscope | Stage 1 only |
| H261 | Endoscopic snare resection of lesion of sigmoid colon using rigid sigmoidoscope | Stage 1 only |
| H281 | Diagnostic endoscopic examination of sigmoid colon and biopsy of lesion of sigmoid colon using rigid sigmoidoscope | Stage 1 only |
| H341 | Open excision of lesion of rectum | Stage 1 only |
| H402 | Trans-sphincteric excision of lesion of recturm | Stage 1 only |
| H412 | Peranal excision of lesion of rectum | Stage 1 only |
| H418 | Other specified other operations on rectum through anus | Stage 1 only |
| H419 | Unspecified other operations on rectum through anus | Stage 1 only |
| H561 | Biopsy of lesion of anus | Stage 1 only |
| H024 | Incidental appendicectomy | C18.1 (appendix tumours) only |
| H019 | Unspecified emergency excision of appendix | C18.1 (appendix tumours) only |
| H011 | Emergency excision of abnormal appendix and drainage HFQ | C18.1 (appendix tumours) only |
|  |  |  |
| Head and neck (C01, C02, C03, C04, C05, C06, C07, C08, C09, C10, C11, C12, C13, C14, C30, C31, C32) |
| E191 | Total pharyngectomy |  |
| E192 | Partial pharyngectomy |  |
| E214 | Plastic repair of pharynx NEC |  |
| E231 | Open excision of lesion of pharynx |  |
| E242 | Endoscopic extirpation of lesion of pharynx NEC |  |
| E291 | Total laryngectomy |  |
| E292 | Partial horizontal laryngectomy |  |
| E293 | Partial vertical laryngectomy |  |
| E294 | Partial laryngectomy NEC |  |
| E295 | Laryngofissure and chordectomy of vocal chord |  |
| E296 | Laryngectomy NEC |  |
| E299 | Unspecified excision of larynx |  |
| E301 | Excision of lesion of larynx using thryotomy as approach |  |
| E341 | Microtherapeutic endoscopic extirpation of lesion of larynx using laser |  |
| E342 | Microtherapeutic endoscopic resection of lesion of larynx NEC |  |
| E343 | Microtherapeutic endoscopic destruction of lesion of larynx NEC |  |
| E352 | Endoscopic resection of lesion of pharynx NEC |  |
| E414 | Tracheo-oesophageal puncture with insertion of speech prothesis |  |
| F011 | Excision of vermilion border of lip and advancement of mucosa of lip |  |
| F018 | Other specified partial excision of lip |  |
| F021 | Excision of lesion of lip |  |
| F042 | Reconstruction of lip using skin flap |  |
| F202 | Excision of lesion of gingiva |  |
| F221 | Total glossectomy |  |
| F222 | Partial glossectomy |  |
| F231 | Excision of lesion of tongue |  |
| F281 | Excision of lesion of palate |  |
| F301 | Plastic repair of palate using flap of palate |  |
| F303 | Plastic repair of palate using flap of tongue |  |
| F304 | Plastic repair of palate using graft of skin |  |
| F305 | Plastic repair of palate using flap of mucosa |  |
| F324 | Operations on uvula NEC |  |
| F328 | Other specified other operations on palate |  |
| F341 | Bilateral dissection tonsillectomy | Tonsil tumours (C09) only |
| F349 | Unspecified excision of tonsil |  |
| F381 | Excision of lesion of floor of mouth |  |
| F382 | Excision of lesion of mouth NEC |  |
| F391 | Reconstruction of mouth using flap NEC |  |
| F392 | Reconstruction of mouth using graft NEC |  |
| F441 | Total excision of parotid gland |  |
| F442 | Partial excision of parotid gland |  |
| F443 | Excision of parotid gland NEC |  |
| F444 | Excision of submandibular gland |  |
| F451 | Excision of lesion of parotid gland |  |
| G021 | Total oesophagectomy and anastomosis of pharynx to stomach |  |
| G032 | Partial oesophagectomy and interposition of microvascularly attached jejunum |  |
| S171 | Distant myocutaneous subcutaneous pedicle flap to head or neck |  |
| S208 | Other specified other distant flap of skin |  |
| S248 | Other specified local flap of skin and muscle |  |
| S288 | Other specified flap of mucosa |  |
| S353 | Split autograft of skin to head or neck NEC |  |
| T851 | Block dissection of cervical lymph nodes |  |
| V061 | Medial maxillectomy |  |
| V068 | Other specified excision of maxilla |  |
| V069 | Unspecified excision of maxilla |  |
| V141 | Hemimandibulectomy |  |
| V142 | Extensive excision of mandible NEC |  |
| V143 | Partial excision of mandible NEC |  |
| V144 | Excision of lesion of mandible |  |
| V149 | Unspecified excision of mandible |  |
| V168 | Other specified division of mandible |  |
| V191 | Reconstruction of mandible |  |
| Y051 | Total excision of organ NOC |  |
| Y592 | Harvest of radial artery flap of skin and fascia |  |
| Y598 | Other specified harvest of flap of skin and fascia |  |
| Y612 | Harvest of flap of skin and pectoralis major muscle |  |
| Y631 | Harvest of flap of latissimus dorsi muscle NEC |  |
| Y638 | Other specified harvest of flap of muscle of trunk |  |
| Y662 | Harvest of bone from rib |  |
|  |  |  |
| Kidney (C64-C66, C68) |    |
| M021 | Nephrectomy and excision of perirenal tissue |
| M022 | Nephroureterectomy NEC |  |
| M023 | Bilateral nephrectomy |  |
| M024 | Excision of half of horseshoe kidney |  |
| M025 | Nephrectomy NEC |  |
| M028 | Other specified total excision of kidney |  |
| M029 | Unspecified total excision of kidney |  |
| M038 | Other specified partial excision of kidney |  |
| M039 | Unspecified partial excision of kidney |  |
| M042 | Open excision of lesion of kidney NEC |  |
| M104 | Endoscopic cryoablation of lesion of kidney |  |
| M137 | Percutaneous radiofrequency ablation of lesion of kidney |
| M181 | Total ureterectomy |  |
| M182 | Excision of segment of ureter |  |
| M183 | Secondary ureterectomy |  |
| M252 | Open excision of lesion of ureter NEC |  |
| M291 | Endoscopic extirpation of lesion of ureter | Tumours of ureter (C66) & pelvis (C65) only |
| Y112 | Cryotherapy to organ NOC |  |
|  |  |  |
| Liver (C22) |   |
| J011 | Orthotopic transplantation of liver NEC |  |
| J015 | Orthotopic transplantation of whole liver |  |
| J019 | Unspecified transplantation of liver |  |
| J021 | Right hemihepatectomy NEC |  |
| J022 | Left hemihepatectomy NEC |  |
| J023 | Resection of segment of liver |  |
| J024 | Wedge excision of liver |  |
| J026 | Extended right hemihepatectomy |  |
| J027 | Extended left hemihepatectomy |  |
| J028 | Other specified partial excision of liver |  |
| J029 | Unspecified partial excision of liver |  |
| J031 | Excision of lesion of liver NEC |  |
| J053 | Open wedge biopsy of lesion of liver |  |
| J101 | Percutaneous transluminal embolisation of hepatic artery |  |
| J124 | Percutaneous radiofrequency ablation of lesion of liver | Stage 1 only |
| J127 | Percutaneous microwave ablation of lesion of liver | Stage 1 only |
|  |  |  |
| Small cell lung cancer (SCLC) and Non small cell lung cancer (NSCLC) (C33-C34) |
| E391 | Open excision of lesion of trachea |  |
| E398 | Other specified partial excision of trachea |  |
| E399 | Unspecified partial excision of trachea |  |
| E438 | Other specified other open operations on trachea |  |
| E441 | Excision of carina |  |
| E461 | Sleeve resection of bronchus and anastomosis HFQ |
| E463 | Excision of lesion of bronchus NEC |
| E468 | Other specified partial extirpation of bronchus |
| E541 | Total pneumonectomy |  |
| E542 | Bilobectomy of lung |  |
| E543 | Lobectomy of lung |  |
| E544 | Excision of segment of lung |  |
| E545 | Partial lobectomy of lung NEC |  |
| E548 | Other specified excision of lung |  |
| E549 | Unspecified excision of lung |  |
| E552 | Open excision of lesion of lung |  |
| E554 | Open destruction of lesion of lung NEC |  |
| E559 | Unspecified open extirpation of lesion of lung |
| T011 | Thoracoplasty |
| T012 | Removal of plombage material from chest wall |
| T013 | Excision of lesion of chest wall |  |
| T018 | Other specified partial excision of chest wall |  |
| T019 | Unspecified partial excision of chest wall |  |
| T023 | Insertion of prosthesis into chest wall NEC |  |
| Oesophagus (C15) |   |
| G011 | Oesophagogastrectomy and anastomosis of oesophagus to stomach |  |
| G013 | Oesophagogastrectomy and anastomosis of oesophagus to jejunum NEC |  |
| G018 | Other specified excision of oesophagus and stomach |  |
| G019 | Unspecified excision of oesophagus and stomach |  |
| G021 | Total oesophagectomy and anastomosis of pharynx to stomach |  |
| G022 | Total oesophagectomy and interposition of microvascularly attached jejunum |  |
| G023 | Total oesophagectomy and interposition of jejunum NEC |  |
| G024 | Total oesophagectomy and interposition of microvascularly attached colon |  |
| G025 | Total oesophagectomy and interposition of colon NEC |  |
| G028 | Other specified total excision of oesophagus |  |
| G029 | Unspecified total excision of oesophagus |  |
| G031 | Partial oesophagectomy and end to end anastomosis of oesophagus |  |
| G032 | Partial oesophagectomy and interposition of microvascularly attached jejunum |  |
| G033 | Partial oesophagectomy and anastomosis of oesophagus to transposed jejunum |  |
| G034 | Partial oesophagectomy and anastomosis of oesophagus to jejunum NEC |  |
| G035 | Partial oesophagectomy and interposition of microvascularly attached colon |  |
| G036 | Partial oesophagectomy and interposition of colon NEC |  |
| G038 | Other specified partial excision of oesophagus |  |
| G039 | Unspecified partial excision of oesophagus |  |
| G146 | Fibreoptic endoscopic submucosal resection of lesion of oesophagus | Stage 1a disease only |
| G171 | Endoscopic snare resection of lesion of oesophagus using rigid oesophagoscope | Stage 1a disease only |
| G271 | Total gastrectomy and excision of surrounding tissue |  |
| G274 | Total gastrectomy and anastomosis of oesophagus to transposed jejunum |  |
| G275 | Total gastrectomy and anastomosis of oesophagus to jejunum NEC |  |
| G279 | Unspecified total excision of stomach |  |
| G421 | Fibreoptic endoscopic submucosal resection of lesion of upper gastrointestinal tract | Stage 1a disease only |
| G431 | Fibreoptic endoscopic snare resection of lesion of upper gastrointestinal tract | Stage 1a disease only |
| G438 | Other specified fibreoptic endoscopic extirpation of lesion of upper gastrointestinal tract | Stage 1a disease only |
|  |  |
| Ovarian (C56-C57, and selected C48 tumours) |   |
| H331 | Abdominoperineal excision of rectum and end colostomy |
| H332 | Proctectomy and anastomosis of colon to anus |
| H333 | Anterior resection of rectum and anastomosis of colon to rectum using staples |
| H334 | Anterior resection of rectum and anastomosis NEC |
| H335 | Rectosigmoidectomy and closure of rectal stump and exteriorisation of bowel |
| H336 | Anterior resection of rectum and exteriorisation of bowel |
| H337 | Perineal resection of rectum HFQ |  |
| H338 | Other specified excision of rectum |  |
| H339 | Unspecified excision of rectum |  |
| Q071 | Abdominal hysterocolpectomy and excision of periuterine tissue |
| Q072 | Abdominal hysterectomy and excision of periuterine tissue NEC |
| Q073 | Abdominal hysterocolpectomy NEC |  |
| Q074 | Total abdominal hysterectomy NEC |  |
| Q075 | Subtotal abdominal hysterectomy |  |
| Q078 | Other specified abdominal excision of uterus |
| Q079 | Unspecified abdominal excision of uterus |  |
| Q081 | Vaginal hysterocolpectomy and excision of periuterine tissue |
| Q082 | Vaginal hysterectomy and excision of periuterine tissue NEC |
| Q083 | Vaginal hysterocolpectomy NEC |  |
| Q088 | Other specified vaginal excision of uterus |  |
| Q089 | Unspecified vaginal excision of uterus |  |
| Q221 | Bilateral salpingoophorectomy |  |
| Q223 | Bilateral oophorectomy NEC |  |
| Q231 | Unilateral salpingoophorectomy NEC |  |
| Q232 | Salpingoophorectomy of remaining solitary fallopian tube and ovary |
| Q235 | Unilateral oophorectomy NEC |  |
| Q236 | Oophorectomy of remaining solitary ovary NEC |
| Q241 | Salpingoophorectomy NEC |  |
| Q243 | Oophorectomy NEC |  |
| Q438 | Other specified partial excision of ovary |  |
| Q439 | Unspecified partial excision of ovary |  |
| Q473 | Open biopsy of lesion of ovary |  |
| Q478 | Other specified other open operations on ovary |
| Q491 | Endoscopic extirpation of lesion of ovary NEC |
| T331 | Open excision of lesion of peritoneum |  |
| T332 | Open destruction of lesion of peritoneum |  |
| T338 | Other specified open extirpation of lesion of peritoneum |
| T339 | Unspecified open extirpation of lesion of peritoneum |
| T361 | Omentectomy |  |
| T362 | Excision of lesion of omentum |  |
| X141 | Total exenteration of pelvis |  |
| X142 | Anterior exenteration of pelvis |  |
| X143 | Posterior exenteration of pelvis |  |
| X148 | Other specified clearance of pelvis |  |
| X149 | Unspecified clearance of pelvis |  |
|  |  |  |
| Pancreas (C25) |   |
| J551 | Total pancreatectomy and excision of surrounding tissue |
| J552 | Total pancreatectomy NEC |  |
| J558 | Other specified total excision of pancreas |  |
| J559 | Unspecified total excision of pancreas |  |
| J561 | Pancreaticoduodenectomy and excision of surrounding tissue |
| J562 | Pancreaticoduodenectomy and resection of antrum of stomach |
| J563 | Pancreaticoduodenectomy NEC |  |
| J568 | Other specified excision of head of pancreas |
| J569 | Unspecified excision of head of pancreas |  |
| J571 | Subtotal pancreatectomy |  |
| J573 | Left pancreatectomy NEC |  |
| J574 | Excision of tail of pancreas and drainage of pancreatic duct |
| J575 | Excision of tail of pancreas NEC |  |
| J578 | Other specified other partial excision of pancreas |
| J579 | Unspecified other partial excision of pancreas |
| J582 | Excision of lesion of pancreas NEC |  |
|  |  |  |
| Prostate (C61) |   |
| M341 | Cystoprostatectomy |  |
| M611 | Total excision of prostate and capsule of prostate |
| M614 | Perineal prostatectomy |  |
| M618 | Other specified open excision of prostate |  |
| M619 | Unspecified open excision of prostate |  |
| M671 | Endoscopic cryotherapy to lesion of prostate |
| M711 | High intensity focused ultrasound of prostate |
| X141 | Total exenteration of pelvis |  |
|  |  |  |
| Skin (Melanoma and Non-Melanoma Skin Cancers (BCC, cSCC, Rare)) |
| B279 | Unspecified total excision of breast |  |
| B283 | Excision of lesion of breast NEC |  |
| B284 | Re-excision of breast margins |  |
| C011 | Exenteration of orbit |  |
| C012 | Enucleation of eye |  |
| C013 | Evisceration of eye |  |
| C018 | Other specified excision of eye |  |
| C019 | Unspecified excision of eye |  |
| C021 | Excision of lesion of orbit |  |
| C022 | Destruction of lesion of orbit |  |
| C028 | Other specified extirpation of lesion of orbit |  |
| C029 | Unspecified extirpation of lesion of orbit |  |
| C101 | Excision of lesion of eyebrow |  |
| C102 | Hair bearing flap to eyebrow |  |
| C103 | Hair bearing graft to eyebrow |  |
| C111 | Excision of lesion of canthus |  |
| C115 | Graft of skin to canthus |  |
| C121 | Excision of lesion of eyelid NEC |  |
| C124 | Curettage of lesion of eyelid | BCC and cSCC tumours only  |
| C126 | Wedge excision of lesion of eyelid |  |
| C141 | Flap of skin to eyelid |  |
| C142 | Graft of skin to eyelid |  |
| C143 | Graft of cartilage to eyelid |  |
| C144 | Graft of skin and fat to eyelid |  |
| C145 | Graft of fascia to eyelid |  |
| C148 | Other specified reconstruction of eyelid |  |
| C149 | Unspecified reconstruction of eyelid |  |
| C162 | Lateral tarsorrhaphy |  |
| C164 | Tarsorrhaphy NEC |  |
| C168 | Other specified other plastic repair of eyelid |  |
| C178 | Other specified other repair of eyelid |  |
| C179 | Unspecified other repair of eyelid |  |
| D011 | Total excision of external ear |  |
| D012 | Partial excision of external ear |  |
| D013 | Excision of preauricular abnormality |  |
| D018 | Other specified excision of external ear |  |
| D019 | Unspecified excision of external ear |  |
| D021 | Excision of lesion of external ear |  |
| D028 | Other specified extirpation of lesion of external ear |  |
| D031 | Reconstruction of external ear using graft |  |
| D032 | Reconstruction of external ear NEC |  |
| D063 | Repair of external ear NEC |  |
| D064 | Graft of skin to external ear |  |
| D065 | Flap of skin to external ear |  |
| D191 | Excision of lesion of middle ear  |  |
| E011 | Total excision of nose |  |
| E018 | Other specified excision of nose |  |
| E019 | Unspecified excision of nose |  |
| E021 | Total reconstruction of nose |  |
| E022 | Reconstruction of nose NEC |  |
| E023 | Septorhinoplasty using implant |  |
| E024 | Septorhinoplasty using graft |  |
| E025 | Reduction rhinoplasty |  |
| E026 | Rhinoplasty NEC |  |
| E027 | Alar reconstruction with cartilage graft |  |
| E028 | Other specified plastic operations on nose |  |
| E029 | Unspecified plastic operations on nose |  |
| E032 | Excision of lesion of septum of nose  |  |
| E037 | Septal reconstruction with cartilage graft |  |
| E091 | Excision of lesion of external nose |  |
| E094 | Shave of skin of nose | BCC and cSCC tumours only  |
| E097 | Graft of skin to external nose |  |
| E661 | Flap of skin to external nose |  |
| F011 | Excision of vermilion border of lip and advancement of mucosa of lip |  |
| F018 | Other specified partial excision of lip |  |
| F019 | Unspecified partial excision of lip |  |
| F021 | Excision of lesion of lip |  |
| F029 | Unspecified extirpation of lesion of lip |  |
| F041 | Reconstruction of lip using tongue flap |  |
| F042 | Reconstruction of lip using skin flap |  |
| F048 | Other specified other reconstruction of lip |  |
| F049 | Unspecified other reconstruction of lip |  |
| F052 | Advancement of mucosa of lip NEC  |  |
| F382 | Excision of lesion of mouth NEC |  |
| F402 | Graft of skin to mouth NEC |  |
| F441 | Total excision of parotid gland |  |
| F442 | Partial excision of parotid gland |  |
| F443 | Excision of parotid gland NEC |  |
| F444 | Excision of submandibular gland |  |
| F445 | Excision of sublingual gland |  |
| F448 | Other specified excision of salivary gland |  |
| F449 | Unspecified excision of salivary gland |  |
| F451 | Excision of lesion of parotid gland |  |
| F452 | Excision of lesion of submandibular gland |  |
| N011 | Excision of scrotum |  |
| N012 | Excision of lesion of scrotum |  |
| N036 | Reconstruction of scrotum |  |
| N052 | Bilateral orchidectomy NEC |  |
| N063 | Orchidectomy NEC |  |
| N241 | Excision of sweat gland bearing skin of male perineum |  |
| N243 | Excision of male periurethral tissue NEC |  |
| N261 | Total amputation of penis |  |
| N262 | Partial amputation of penis |  |
| N268 | Other specified amputation of penis |  |
| N271 | Excision of lesion of penis |  |
| N287 | Graft to penis |  |
| N303 | Circumcision |  |
| P011 | Clitoridectomy |  |
| P031 | Excision of Bartholin gland  |  |
| P033 | Excision of lesion of Bartholin gland |  |
| P051 | Total excision of vulva  |  |
| P052 | Partial excision of vulva |  |
| P054 | Excision of lesion of vulva NEC |  |
| P058 | Other specified excision of vulva |  |
| P059 | Unspecified excision of vulva |  |
| P065 | Excision of lesion of labia |  |
| P071 | Plastic repair of vulva |  |
| P078 | Other specified repair of vulva |  |
| P111 | Excision of lesion of female perineum |  |
| P137 | Excision of sweat gland bearing bearing skin of female perineum |  |
| P151 | Hymenectomy |  |
| P152 | Excision of hymenal tag |  |
| P201 | Excision of lesion of vagina |  |
| S018 | Other specified plastic excision of skin of head or neck |  |
| S019 | Unspecified plastic excision of skin of head or neck |  |
| S028 | Other specified plastic excision of skin of abdominal wall |  |
| S029 | Unspecified plastic excision of skin of abdominal wall |  |
| S038 | Other specified plastic excision of skin of other site |  |
| S039 | Unspecified plastic excision of skin of other site |  |
| S041 | Excision of sweat gland bearing skin of axilla |  |
| S042 | Excision of sweat gland bearing skin of groin |  |
| S043 | Excision of sweat gland bearing skin NEC |  |
| S048 | Other specified other excision of skin |  |
| S049 | Unspecified other excision of skin |  |
| S051 | Microscopically controlled excision of lesion of skin of head or neck using fresh tissue technique |  |
| S052 | Microscopically controlled excision of lesion of skin using fresh tissue technique NEC |  |
| S053 | Microscopically controlled excision of lesion of skin of head or neck using chemosurgical technique |  |
| S054 | Microscopically controlled excision of lesion of skin using chemosurgical technique NEC |  |
| S055 | Microscopically controlled excision of lesion of skin of head or neck NEC |  |
| S058 | Other specified microscopically controlled excision of lesion of skin |  |
| S059 | Unspecified microscopically controlled excision of lesion of skin |  |
| S063 | Shave excision of lesion of skin of head or neck |  |
| S064 | Shave excision of lesion of skin NEC |  |
| S065 | Excision of lesion of skin of head or neck NEC |  |
| S066 | Re-excision of skin margins of head or neck |  |
| S067 | Re-excision of skin margins NEC |  |
| S068 | Other specified other excision of lesion of skin |  |
| S069 | Unspecified other excision of lesion of skin |  |
| S081 | Curettage and cauterisation of lesion of skin of head or neck | BCC and cSCC tumours only  |
| S082 | Curettage and cauterisation of lesion of skin NEC | BCC and cSCC tumours only  |
| S083 | Curettage of lesion of skin of head or neck NEC | BCC and cSCC tumours only  |
| S088 | Other specified curettage of lesion of skin | BCC and cSCC tumours only  |
| S089 | Unspecified curettage of lesion of skin | BCC and cSCC tumours only  |
| S143 | Shaved deep ellipse biopsy of lesion of skin of head or neck | BCC and cSCC tumours only  |
| S144 | Shaved deep ellipse biopsy of lesion of skin NEC | BCC and cSCC tumours only  |
| S171 | Distant myocutaneous subcutaneous pedicle flap to head or neck |  |
| S172 | Distant myocutaneous subcutaneous pedicle flap NEC |  |
| S173 | Distant myocutaneous flap to head or neck NEC |  |
| S174 | Distant myocutaneous free flap to head or neck |  |
| S175 | Distant myocutaneous free flap NEC |  |
| S178 | Other specified distant flap of skin and muscle |  |
| S179 | Unspecified distant flap of skin and muscle |  |
| S181 | Distant fasciocutaneous subcutaneous pedicle flap to head or neck |  |
| S182 | Distant fasciocutaneous subcutaneous pedicle flap NEC |  |
| S183 | Distant fasciocutaneous flap to head or neck NEC |  |
| S184 | Distant fasciocutaneous free flap to head or neck |  |
| S185 | Distant fasciocutaneous free flap NEC |  |
| S188 | Other specified distant flap of skin and fascia |  |
| S189 | Unspecified distant flap of skin and fascia |  |
| S191 | Distant tube pedicle flap of skin to head or neck |  |
| S192 | Distant tube pedicle flap of skin NEC |  |
| S198 | Other specified distant pedicle flap of skin |  |
| S199 | Unspecified distant pedicle flap of skin |  |
| S201 | Axial pattern distant flap of skin to head or neck |  |
| S202 | Axial pattern distant flap of skin NEC |  |
| S203 | Random pattern distant flap of skin to head or neck |  |
| S204 | Random pattern distant flap of skin NEC |  |
| S205 | Distant flap of skin to head or neck NEC |  |
| S206 | Distant free flap of skin to head or neck NEC |  |
| S207 | Distant free flap of skin NEC |  |
| S208 | Other specified other distant flap of skin |  |
| S209 | Unspecified other distant flap of skin |  |
| S211 | Hair bearing flap of skin to scalp for male pattern baldness |  |
| S212 | Hair bearing flap of skin to scalp NEC |  |
| S213 | Hair bearing flap of skin to nasolabial area |  |
| S214 | Hair bearing flap of skin to chin area |  |
| S218 | Other specified hair bearing flap of skin |  |
| S219 | Unspecified hair bearing flap of skin |  |
| S221 | Neurovascular island sensory flap of skin to head or neck |  |
| S222 | Neurovascular island sensory flap of skin NEC |  |
| S223 | Local sensory flap of skin to head or neck |  |
| S224 | Local sensory flap of skin NEC |  |
| S228 | Other specified sensory flap of skin |  |
| S229 | Unspecified sensory flap of skin |  |
| S231 | Z plasty to head or neck |  |
| S232 | Z plasty NEC |  |
| S233 | W plasty to head or neck |  |
| S234 | W plasty NEC |  |
| S238 | Other specified flap operations to relax contracture of skin |  |
| S239 | Unspecified flap operations to relax contracture of skin |  |
| S241 | Local myocutaneous subcutaneous pedicle flap to head or neck |  |
| S242 | Local myocutaneous subcutaneous pedicle flap NEC |  |
| S243 | Local myocutaneous flap to head or neck NEC |  |
| S248 | Other specified local flap of skin and muscle |  |
| S249 | Unspecified local flap of skin and muscle |  |
| S251 | Local fasciocutaneous subcutaneous pedicle flap to head or neck |  |
| S252 | Local fasciocutaneous subcutaneous pedicle flap NEC |  |
| S253 | Local fasciocutaneous flap to head or neck nec |  |
| S258 | Other specified local flap of skin and fascia |  |
| S259 | Unspecified local flap of skin and fascia |  |
| S304 | Final inset of flap of skin to head or neck |  |
| S261 | Axial pattern local subcutaneous pedicle flap of skin to head or neck |  |
| S262 | Axial pattern local subcutaneous pedicle flap of skin NEC |  |
| S263 | Random pattern local subcutaneous pedicle flap of skin to head or neck |  |
| S264 | Random pattern local subcutaneous pedicle flap of skin NEC |  |
| S265 | Local subcutaneous pedicle flap of skin to head or neck NEC |  |
| S268 | Other specified local subcutaneous pedicle flap of skin |  |
| S269 | Unspecified local subcutaneous pedicle flap of skin |  |
| S271 | Axial pattern local flap of skin to head or neck NEC |  |
| S272 | Axial pattern local flap of skin NEC |  |
| S273 | Random pattern local flap of skin to head or neck NEC |  |
| S274 | Random pattern local flap of skin NEC |  |
| S275 | Local flap of skin to head or neck NEC |  |
| S278 | Other specified other local flap of skin |  |
| S279 | Unspecified other local flap of skin |  |
| S291 | Distant osteocutaneous pedicle flap to head or neck |  |
| S292 | Distant osteocutaneous pedicle flap NEC |  |
| S293 | Distant osteocutaneous flap to head or neck NEC |  |
| S294 | Distant osteocutaneous free flap to head or neck |  |
| S295 | Distant osteocutaneous free flap NEC |  |
| S298 | Other specified distant flap of skin and bone |  |
| S299 | Unspecified distant flap of skin and bone |  |
| S302 | Transfer of flap of skin to head or neck |  |
| S314 | Final inset of flap of skin NEC |  |
| S321 | Distant osteomusculocutaneous pedicle flap of head or neck |  |
| S322 | Distant osteomusculocutaneous pedicle flap NEC |  |
| S323 | Distant osteomusculocutaneous flap to head or neck NEC |  |
| S324 | Distant osteomusculocutaneous free flap to head or neck |  |
| S325 | Distant osteomusculocutaneous free flap NEC |  |
| S328 | Other specified distant flap of skin and multiple tissues |  |
| S329 | Unspecified distant flap of skin and multiple tissues |  |
| S338 | Other specified hair bearing graft of skin to scalp |  |
| S339 | Unspecified hair bearing graft of skin to scalp |  |
| S341 | Hair bearing graft to nasolabial area |  |
| S348 | Other specified hair bearing graft of skin to other site |  |
| S349 | Unspecified hair bearing graft of skin to other site |  |
| S351 | Meshed split autograft of skin to head or neck |  |
| S352 | Meshed split autograft of skin NEC |  |
| S353 | Split autograft of skin to head or neck NEC |  |
| S358 | Other specified split autograft of skin |  |
| S359 | Unspecified split autograft of skin |  |
| S361 | Full thickness autograft of skin to head or neck |  |
| S362 | Full thickness autograft of skin NEC |  |
| S363 | Composite autograft of skin to head or neck |  |
| S364 | Composite autograft of skin NEC |  |
| S365 | Pinch graft of skin to head or neck |  |
| S366 | Pinch graft of skin NEC |  |
| S368 | Other specified other autograft of skin |  |
| S369 | Unspecified other autograft of skin |  |
| S371 | Allograft of skin to head or neck |  |
| S372 | Allograft of skin NEC |  |
| S373 | Xenograft of skin to head or neck |  |
| S374 | Xenograft of skin NEC |  |
| S378 | Other specified other graft of skin |  |
| S379 | Unspecified other graft of skin |  |
| S391 | Allograft of amniotic membrane to head or neck |  |
| S392 | Allograft of amniotic membrane NEC |  |
| S398 | Other specified graft of other tissue to skin |  |
| S399 | Unspecified graft of other tissue to skin |  |
| S641 | Excision of nail bed |  |
| T013 | Excision of lesion of chest wall |  |
| T313 | Excision of lesion of anterior abdominal wall NEC |  |
| T851 | Block dissection of cervical lymph nodes |  |
| T852 | Block dissection of axillary lymph nodes |  |
| T853 | Block dissection of mediastinal lymph nodes |  |
| T854 | Block dissection of para-aortic lymph nodes |  |
| T855 | Block dissection of inguinal lymph nodes |  |
| T856 | Block dissection of pelvic lymph nodes |  |
| T858 | Other specified block dissection of lymph nodes |  |
| T859 | Unspecified block dissection of lymph nodes |  |
| T911 | Biopsy of sentinel lymph node NEC |  |
| T962 | Excision of lesion of soft tissue NEC |  |
| X071 | Forequarter amputation |  |
| X072 | Disarticulation of shoulder |  |
| X073 | Amputation of arm above elbow |  |
| X074 | Amputation of arm through elbow |  |
| X075 | Amputation of arm through forearm |  |
| X078 | Other specified amputation of arm |  |
| X079 | Unspecified amputation of arm |  |
| X081 | Amputation of hand at wrist |  |
| X082 | Amputation of thumb |  |
| X083 | Amputation of phalanx of finger |  |
| X084 | Amputation of finger NEC |  |
| X088 | Other specified amputation of hand |  |
| X089 | Unspecified amputation of hand |  |
| X091 | Hindquarter amputation |  |
| X092 | Disarticulation of hip |  |
| X093 | Amputation of leg above knee |  |
| X094 | Amputation of leg through knee |  |
| X095 | Amputation of leg below knee |  |
| X098 | Other specified amputation of leg |  |
| X099 | Unspecified amputation of leg |  |
| X101 | Amputation of foot through ankle |  |
| X102 | Disarticulation of tarsal bones |  |
| X103 | Disarticulation of metatarsal bones |  |
| X104 | Amputation through metatarsal bones |  |
| X108 | Other specified amputation of foot |  |
| X109 | Unspecified amputation of foot |  |
| X111 | Amputation of great toe |  |
| X112 | Amputation of phalanx of toe |  |
| X118 | Other specified amputation of toe |  |
| X119 | Unspecified amputation of toe |  |
| X121 | Reamputation at higher level |  |
| X122 | Excision of lesion of amputation stump |  |
| X123 | Shortening of length of amputation stump |  |
| X124 | Revision of coverage of amputation stump |  |
| X125 | Drainage of amputation stump |  |
| X128 | Other specified operations on amputation stump |  |
| X129 | Unspecified operations on amputation stump |  |
| Y551 | Harvest of random pattern flap of skin from limb |  |
| Y552 | Harvest of random pattern flap of skin from limb |  |
| Y553 | Harvest of random pattern flap of skin from limb |  |
| Y554 | Harvest of random pattern flap of skin from limb |  |
| Y555 | Harvest of random pattern flap of skin from limb |  |
| Y556 | Harvest of random pattern flap of skin from limb |  |
| Y558 | Harvest of random pattern flap of skin from limb |  |
| Y559 | Harvest of random pattern flap of skin from limb |  |
| Y561 | Harvest of random pattern flap of skin from other site |  |
| Y562 | Harvest of random pattern flap of skin from other site |  |
| Y563 | Harvest of random pattern flap of skin from other site |  |
| Y564 | Harvest of random pattern flap of skin from other site |  |
| Y568 | Harvest of random pattern flap of skin from other site |  |
| Y569 | Harvest of random pattern flap of skin from other site |  |
| Y571 | Harvest of axial pattern flap of skin |  |
| Y572 | Harvest of axial pattern flap of skin |  |
| Y573 | Harvest of axial pattern flap of skin |  |
| Y574 | Harvest of axial pattern flap of skin |  |
| Y575 | Harvest of axial pattern flap of skin |  |
| Y576 | Harvest of axial pattern flap of skin |  |
| Y578 | Harvest of axial pattern flap of skin |  |
| Y579 | Harvest of axial pattern flap of skin |  |
| Y581 | Harvest of skin for graft |  |
| Y588 | Harvest of skin for graft |  |
| Y589 | Harvest of skin for graft |  |
| Y591 | Harvest of flap of skin and fascia |  |
| Y592 | Harvest of flap of skin and fascia |  |
| Y593 | Harvest of flap of skin and fascia |  |
| Y594 | Harvest of flap of skin and fascia |  |
| Y595 | Harvest of flap of skin and fascia |  |
| Y596 | Harvest of flap of skin and fascia |  |
| Y598 | Harvest of flap of skin and fascia |  |
| Y599 | Harvest of flap of skin and fascia |  |
| Y601 | Other harvest of fascia |  |
| Y602 | Other harvest of fascia |  |
| Y604 | Other harvest of fascia |  |
| Y608 | Other harvest of fascia |  |
| Y609 | Other harvest of fascia |  |
| Y611 | Harvest of flap of skin and muscle of trunk |  |
| Y612 | Harvest of flap of skin and muscle of trunk |  |
| Y613 | Harvest of flap of skin and muscle of trunk |  |
| Y614 | Harvest of flap of skin and muscle of trunk |  |
| Y615 | Harvest of flap of skin and muscle of trunk |  |
| Y618 | Harvest of flap of skin and muscle of trunk |  |
| Y619 | Harvest of flap of skin and muscle of trunk |  |
| Y621 | Harvest of flap of skin and muscle of other site |  |
| Y622 | Harvest of flap of skin and muscle of other site |  |
| Y623 | Harvest of flap of skin and muscle of other site |  |
| Y628 | Harvest of flap of skin and muscle of other site |  |
| Y629 | Harvest of flap of skin and muscle of other site |  |
| Y671 | Harvest of other multiple tissue |  |
| Y672 | Harvest of other multiple tissue |  |
| Y678 | Harvest of other multiple tissue |  |
| Y679 | Harvest of other multiple tissue |  |
| Y692 | Harvest of other tissue |  |
|  |  |  |
| Stomach (C16) |   |
| G011 | Oesophagogastrectomy and anastomosis of oesophagus to stomach |  |
| G012 | Oesophagogastrectomy and anastomosis of oesophagus to transposed jejunum |  |
| G013 | Oesophagogastrectomy and anastomosis of oesophagus to jejunum NEC |  |
| G039 | Unspecified partial excision of oesophagus |  |
| G271 | Total gastrectomy and excision of surrounding tissue |  |
| G272 | Total gastrectomy and anastomosis of oesophagus to duodenum |  |
| G273 | Total gastrectomy and interposition of jejunum |  |
| G274 | Total gastrectomy and anastomosis of oesophagus to transposed jejunum |  |
| G275 | Total gastrectomy and anastomosis of oesophagus to jejunum NEC |  |
| G278 | Other specified total excision of stomach |  |
| G279 | Unspecified total excision of stomach |  |
| G281 | Partial gastrectomy and anastomosis of stomach to duodenum |  |
| G282 | Partial gastrectomy and anastomosis of stomach to transposed jejunum |  |
| G283 | Partial gastrectomy and anastomosis of stomach to jejunum NEC |  |
| G288 | Other specified partial excision of stomach |  |
| G289 | Unspecified partial excision of stomach |  |
| G421 | Fibreoptic endoscopic submucosal resection of lesion of upper gastrointestinal tract | Stage 1a disease only |
| G146 | Fibreoptic endoscopic submucosal resection of lesion of oesophagus | Stage 1a disease only |
| G449 | Unspecified other therapeutic fibreoptic endoscopic operations on upper gastrointestinal tract | Stage 1a disease only |
|  |  |  |
| Testis (C62, D292) |
| N051 | Bilateral Subcapsular Orchidectomy |
| N052 | Bilateral Orchidectomy NEC, Ablation of Testes |
| N053 | Bilateral Inguinal Orchidectomy |
| N061 | Subcapsular Orchidectomy NEC |
| N063 | Orchidectomy NEC |
| N066 | Inguinal Orchidectomy NEC |
| N068 | Other Specified Other Excision of Testis |
| N069 | Unspecified Other Excision of Testis |
| N072 | Destruction Of Lesion of Testis |
| N078 | Other Specified Extirpation of Lesion of Testis |
| N079 | Unspecified Extirpation of Lesion of Testis |
| X163 | Excision of Gonad from Abdomen |
| X164 | Excision of Gonad from Pelvis |
| X165 | Excision of Gonad from Inguinal Canal |
| X166 | Excision of Gonad NEC |
|  |  |  |
| Uterine (C54-C55) |   |
| Q071 | Abdominal hysterocolpectomy and excision of periuterine tissue |
| Q072 | Abdominal hysterectomy and excision of periuterine tissue NEC |
| Q073 | Abdominal hysterocolpectomy NEC |  |
| Q074 | Total abdominal hysterectomy NEC |  |
| Q075 | Subtotal abdominal hysterectomy |  |
| Q078 | Other specified abdominal excision of uterus |
| Q079 | Unspecified abdominal excision of uterus |  |
| Q081 | Vaginal hysterocolpectomy and excision of periuterine tissue |
| Q082 | Vaginal hysterectomy and excision of periuterine tissue NEC |
| Q083 | Vaginal hysterocolpectomy NEC |  |
| Q088 | Other specified vaginal excision of uterus |  |
| Q089 | Unspecified vaginal excision of uterus |  |
| Q093 | Open excision of lesion of uterus NEC |  |
| Q161 | Vaginal excision of lesion of uterus |  |
| Q221 | Bilateral salpingoophorectomy |  |
| Q222 | Bilateral salpingectomy NEC |  |
| Q223 | Bilateral oophorectomy NEC |  |
| Q228 | Other specified bilateral excision of adnexa of uterus |
| Q229 | Unspecified bilateral excision of adnexa of uterus |
| Q231 | Unilateral salpingoophorectomy NEC |  |
| Q232 | Salpingoophorectomy of remaining solitary fallopian tube and ovary |
| Q235 | Unilateral oophorectomy NEC |  |
| Q236 | Oophorectomy of remaining solitary ovary NEC |
| Q238 | Other specified unilateral excision of adnexa of uterus |
| Q239 | Unspecified unilateral excision of adnexa of uterus |
| Q521 | Excision of lesion of broad ligament of uterus |
| X141 | Total exenteration of pelvis |  |
| X142 | Anterior exenteration of pelvis |  |
| X143 | Posterior exenteration of pelvis |  |
| X148 | Other specified clearance of pelvis |  |
| X149 | Unspecified clearance of pelvis |  |
|  |  |  |

# Appendix 4: Example code

--The code presented below was used to generate the \*\*\*analysislouisereynolds.av\_treatment\_table\_1319\_4p7@casref01\*\*\* table AND should be used to identify treatments for cancers diagnosed in 2013-2019.

--There are also minor corrections to the code, so it supersedes the code published in SOP version 4.6 for 2013-2018 diagnoses

-------------------------------------User notes:---------------

-- This is the SQL to generate treatment flags (resection, chemo, radio) for 2013-19 diagnoses, including demographic & geographies breakdown

--It uses these tables in casref01:

--analysislouisereynolds.opcs4resection\_lookup\_13\_19@casref01

--analysislouisereynolds.timeframe\_lookup\_13\_19@casref01

--1. Set your connection to casref01

--2. Create each table in turn in the SQL, starting with your cohort of interest.

--If limiting the cohort, do this in the first table (tr\_tumour\_cohort\_d)

--3. Then the last table brings all the previous ones together into your final export.

--4. After you run each new table, you need to index it and create database stats - this optimises performance.

--This is included throughout using the create index and execute commands

--You only need to create the database stats if you are creating and using that table the same day (otherwise they are automatically generated overnight)

--You will need to change analysislouisereynolds to your username

--If, after creating and indexing the tables, you need to rerun any, it may be more efficient to truncate the table than drop and create it again, e.g.:

--Truncate table tr\_tumour\_cohort;

--insert into tr\_tumour\_cohort\_d (

--5. Alternatively you can use the final table we have already created here:

--\*\*\*analysislouisereynolds.av\_treatment\_table\_1319\_4p7@casref01\*\*\*

--6. If analysing in stata, you can use the code below to collapse the data down so it’s not identifiable (example below groups by stage, cancer type & diagnosis year)

--collapse (count) tumourid, by (cancergroup stage\_group rt\_flag ct\_flag SG\_flag diagnosisyear)

------------------------------------------------------------------------------

------------------------------------------------------------------------------

 -------- CREATE TUMOUR COHORT TABLE -------------------------

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------------------------------------------------------------------------------

CREATE TABLE tr\_tumour\_cohort AS

--Skin cancer have been defined in the at\_tumour\_skin table and so the skin cohort needs to be selected separately to the cohort for other tumours and joined together

WITH skin\_cohort AS

--Create cohort of non-keratinocyte skin cancers

(SELECT ats.patientid, ats.tumourid, ats.diagnosisdatebest, ats.diagnosisyear, avt.nhsnumber, avt.figo, avt.sex, avt.ethnicity, avt.morph\_icd10\_o2, avt.fiveyearageband, avt.age, avt.dedup\_flag, avt.site\_icd10\_o2, avt.site\_icd10\_o2\_3char, avt.ctry\_code, avt.statusofregistration

,CASE WHEN tumour\_type\_2 = 'Melanoma' THEN 'NON-KC\_MELANOMA'

 WHEN tumour\_type\_2 = 'Rare' THEN 'NON-KC\_RARE'

 END AS tumour\_code

FROM analysisbirgittavanbodegraven.at\_tumour\_skin@casref01 ats

LEFT JOIN av2019.at\_tumour\_england@casref01 avt ON ats.tumourid=avt.tumourid

WHERE ats.diagnosisyear BETWEEN 2013 AND 2019

AND ats.tumour\_type\_2 IN ('Melanoma', 'Rare')

AND avt.ctry\_code = 'E'

AND avt.statusofregistration = 'F'

AND avt.dedup\_flag = '1'

AND avt.age BETWEEN 0 AND 200

AND avt.sex IN (1,2)

UNION

--Create cohort of keratinoctye skin cancers following the first ever registration of BCC and first ever registration of cSCC tumours in addition to all genital BCC tumours and all genital cSCC tumours

SELECT ats.patientid, ats.tumourid, ats.diagnosisdatebest, ats.diagnosisyear, avt.nhsnumber, avt.figo, avt.sex, avt.ethnicity, avt.morph\_icd10\_o2, avt.fiveyearageband, avt.age, avt.dedup\_flag, avt.site\_icd10\_o2, avt.site\_icd10\_o2\_3char, avt.ctry\_code, avt.statusofregistration

, CASE WHEN tumour\_type\_3 = 'BCC' THEN 'KC\_BCC'

 WHEN tumour\_type\_3 = 'cSCC' THEN 'KC\_CSCC'

 END AS tumour\_code

FROM analysisbirgittavanbodegraven.at\_tumour\_skin@casref01 ats

LEFT JOIN av2019.at\_tumour\_england@casref01 avt ON ats.tumourid=avt.tumourid

WHERE ats.diagnosisyear BETWEEN 2013 AND 2019

AND (ats.tumour\_type\_4 IN ('Genital BCC', 'Genital cSCC')

OR ats.tumour\_type\_5 IN ('First BCC', 'First cSCC'))

AND avt.ctry\_code = 'E'

AND avt.statusofregistration = 'F'

AND avt.dedup\_flag = '1'

AND avt.age BETWEEN 0 AND 200

AND avt.sex IN (1,2)),

-- Create tumour cohort for all other (non skin) tumours

non\_skin AS

(SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, site\_icd10\_o2, figo, sex, ethnicity, morph\_icd10\_o2, fiveyearageband, age

--Create amended tumour\_code variable to differentiate between ovarian and non-ovarian C48 tumours, changes also for brain and testes.

,CASE

WHEN avt.site\_icd10\_o2\_3char IN ('C48')

AND (avt.morph\_icd10\_o2 NOT IN (8693, 8800, 8801, 8802, 8803, 8804, 8805, 8806, 8963, 8990, 8991, 9040, 9041, 9042, 9043, 9044, 8810, 9490, 9500)

AND (avt.morph\_icd10\_o2 NOT BETWEEN 8811 AND 8921)

AND (avt.morph\_icd10\_o2 NOT BETWEEN 9120 AND 9373)

AND (avt.morph\_icd10\_o2 NOT BETWEEN 9530 AND 9582)

AND avt.sex=2)

THEN 'C48OVARY'

WHEN avt.site\_icd10\_o2\_3char IN ('C48') THEN 'C48OTHER'

WHEN avt.site\_icd10\_o2 IN ('D391') THEN 'D39OVARY'

WHEN avt.site\_icd10\_o2\_3char = 'D39' AND avt.site\_icd10\_o2 NOT IN ('D391') THEN 'D39OTHER'

WHEN avt.site\_icd10\_o2 IN ('D292') THEN 'D29TESTES'

WHEN avt.site\_icd10\_o2\_3char = 'D29' AND avt.site\_icd10\_o2 NOT IN ('D292') THEN 'D29OTHER'

WHEN avt.site\_icd10\_o2 IN ('C751','C752','C753') THEN 'C75BRAIN'

WHEN avt.site\_icd10\_o2\_3char = 'C75' AND avt.site\_icd10\_o2 NOT IN ('C751','C752','C753') THEN 'C75OTHER'

WHEN avt.site\_icd10\_o2 IN ('D320','D321','D329') THEN 'D32BRAIN'

WHEN avt.site\_icd10\_o2 IN ('D330','D331','D332','D333','D334','D337','D339') THEN 'D33BRAIN'

WHEN avt.site\_icd10\_o2 IN ('D352','D353','D354') THEN 'D35BRAIN'

WHEN avt.site\_icd10\_o2 IN ('D420','D421','D429') THEN 'D42BRAIN'

WHEN avt.site\_icd10\_o2 IN ('D430','D431','D432','D433','D434','D437','D439') THEN 'D43BRAIN'

WHEN avt.site\_icd10\_o2 IN ('D443','D444','D445') THEN 'D44BRAIN'

ELSE avt.site\_icd10\_o2\_3char

END AS tumour\_code

FROM av2019.at\_tumour\_england@casref01 AVT

--Define cohort of interest here

WHERE avt.diagnosisyear BETWEEN 2013 AND 2019

AND avt.site\_icd10\_o2\_3char NOT IN ('D01','D03','D04','D06','D07','D11','D13','D15','D16','D18','D25','D27','D36','D40','D48','C44')

AND avt.cascade\_inci\_flag = 1

AND avt.ctry\_code = 'E'

AND avt.statusofregistration = 'F'

AND avt.dedup\_flag = '1'

AND avt.age BETWEEN 0 AND 200

AND avt.sex IN (1,2)),

--Remove any tumours from the all tumours cohort that also appear in the skin cohort to avoid duplication

non\_skin\_cohort AS

(SELECT nsk.tumourid, nsk.patientid, nsk.nhsnumber, nsk.diagnosisdatebest, nsk.site\_icd10\_o2, nsk.figo, nsk.sex, nsk.ethnicity, nsk.morph\_icd10\_o2, nsk.fiveyearageband, nsk.age, nsk.tumour\_code

FROM non\_skin nsk

LEFT JOIN skin\_cohort skn ON nsk.tumourid=skn.tumourid

WHERE skn.tumourid IS NULL),

--Now union together the skin and non-skin cancer cohorts to create the full cohort

tumour\_cohort AS

(SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, site\_icd10\_o2, figo, sex, ethnicity, morph\_icd10\_o2, fiveyearageband, age, tumour\_code

FROM skin\_cohort

UNION

SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, site\_icd10\_o2, figo, sex, ethnicity, morph\_icd10\_o2, fiveyearageband, age, tumour\_code

FROM non\_skin\_cohort)

--Identify patients with multiple tumours wihtin an 18th month period with tumour\_flag

SELECT tumourid, patientid, nhsnumber, diagnosisdatebest, site\_icd10\_o2, figo, sex, ethnicity, morph\_icd10\_o2, fiveyearageband, age, tumour\_code, tumour\_flag

FROM

(SELECT avt.tumourid, avt.patientid, avt.nhsnumber, avt.diagnosisdatebest, avt.site\_icd10\_o2, avt.figo, avt.sex, avt.ethnicity, avt.morph\_icd10\_o2, avt.fiveyearageband, avt.age, avt.tumour\_code

-- This join flags any tumours diagnosed in 2013-19 that belong to a patient who had another tumour in the 18 months before or after that diagnosis

--(so that later, patient level datasets (hes, sact, rtds) are only used for patients with 1 tumour)

-- Tumour\_flag = 1; the tumour belonged to a patient who had another tumour within 18 months

,CASE WHEN ABS(avt.diagnosisdatebest-avt2.diagnosisdatebest)<548 THEN 1 ELSE 0 END AS tumour\_flag

-- In the process of joining AVT2 to AVT to identify multiple tumours, duplicate rows are generated

-- The difference between diagnosis date for tumours in AVT AND AVT2 ranks multiple tumours where more than one exists AND drops all but the closest tumour to the original tumour.

-- Where rk = 1; this is the tumour record to keep

,RANK() OVER (PARTITION BY avt.tumourid ORDER BY ABS(avt.diagnosisdatebest-avt2.diagnosisdatebest) ASC, avt2.tumourid) AS rk

FROM tumour\_cohort AVT

-- Multiple tumours join:

-- For tumours diagnosed from 2013-2019, identify any other tumour IDs that occurred between 2011- 2021

-- A second copy of the tumour cohort (AVT2) is joined to the original tumour cohort of 2013-19 diagnoses (TC)

-- Records from AVT2 are only joined if the patient ID is the same but the tumour ID is different

LEFT JOIN av2019.at\_tumour\_england@casref01 AVT2 ON avt.patientid=avt2.patientid

AND NOT(avt.tumourid=avt2.tumourid)

--AND avt2.cascade\_inci\_flag = 1

AND avt2.site\_icd10\_o2\_3char NOT IN ('D01','D03','D04','D06','D07','D11','D13','D15','D16','D18','D25','D27','D36','D40','D48','C44')

AND avt2.diagnosisyear BETWEEN 2011 AND 2021

--Removes duplicate tumour rows that had been added to identify patients with multiple tumours

)WHERE rk=1;

--Create table indexes for tumour cohort table

CREATE UNIQUE INDEX analysislouisereynolds.tr\_tumcohort\_tumourid\_uq ON analysislouisereynolds.tr\_tumour\_cohort ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE INDEX analysislouisereynolds.tr\_tumcohort\_patientid\_ix ON analysislouisereynolds.tr\_tumour\_cohort ( patientid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE INDEX analysislouisereynolds.tr\_tumcohort\_nhsnumber\_ix ON analysislouisereynolds.tr\_tumour\_cohort ( nhsnumber ) NOLOGGING TABLESPACE analysisdata\_IX;

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_tumour\_cohort')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_tumcohort\_tumourid\_uq')

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--------------------CREATE SURGERY FLAG TABLES - ALL SITES-------------

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--1)---------------- ALL SITES - SURGERY FROM AT\_TREATMENT\_ENGLAND ------------------

-- Create a surgery flag for the tumour if:

-- there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is in the tumour resection list

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

CREATE TABLE tr\_av\_sg AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS avsg\_flag

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk , eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

(avtreat.eventdate-tc.diagnosisdatebest) AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk

, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z', '01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

INNER JOIN analysislouisereynolds.opcs4resection\_lookup\_13\_19@casref01 opcs ON opcs.tumouricdsite3code = tc.tumour\_code AND TRIM(opcs.opcsresectioncode) = avtreat.opcs4\_code

)

WHERE rk=1

));

--2)--------------- ALL SITES - SURGERY FROM HES ------------------

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the operation date (opertn) occurred in the relevant timeframe create table

CREATE TABLE tr\_hes\_sg AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS hessg\_flag

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk , opdate, hessg\_trust\_code

FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN analysislouisereynolds.opcs4resection\_lookup\_13\_19@casref01 opcs ON opcs.tumouricdsite3code = tc.tumour\_code AND TRIM(opcs.opcsresectioncode) = ho.opertn

)

WHERE rk=1

));

------------------------------------------------------------------------------

-----------CREATE SURGERY FLAG TABLES - STAGE SPECIFIC RESECTIONS------------

------------------------------------------------------------------------------

--3)---------------- LIVER C22 - AT\_TREATMENT\_ENGLAND ------------------

-- Create a surgery flag for the tumour if:

-- there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is a percutaneous radiofrequency AND microwave ablation of lesion of liver (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

CREATE TABLE tr\_av\_liver as (

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS liver\_avtreat

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('J124','J127') AND tc.tumour\_code IN ('C22'))

WHERE rk=1));

--4)---------------- LIVER C22 - HES------------------

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4\_code is a percutaneous radiofrequency AND microwave ablation of lesion of liver (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

CREATE TABLE tr\_hes\_liver AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS liver\_hes

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,pos) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('J124','J127') AND tc.tumour\_code in ('C22'))

WHERE rk=1));

--------------------------------------------------------------------------------

--5)---------------- OESOPHAGUS C15 - AT\_TREATMENT\_ENGLAND ------------------

-- Create a surgery flag for the tumour if:

-- there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is a fibreoptic endoscopic resection of lesions of upper gastrointestinal tract AND oesophagus (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

CREATE TABLE tr\_av\_oesoph AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS oesoph\_avtreat

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('G421','G431','G146','G171','G438') AND tc.tumour\_code IN ('C15'))

WHERE rk=1));

--6)---------------- OESOPHAGUS C15 - HES ------------------

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4\_code is a fibreoptic endoscopic resection of lesions of upper gastrointestinal tract AND oesophagus (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

CREATE TABLE tr\_hes\_oesoph AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS oesoph\_hes

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('G421','G431','G146','G171','G438') AND tc.tumour\_code IN ('C15'))

WHERE rk=1));

--------------------------------------------------------------------------------

--7)---------------- STOMACH C16 - AT\_TREATMENT\_ENGLAND ------------------

-- Create a surgery flag for the tumour if:

-- there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is a fibreoptic endoscopic resection of lesions of upper gastrointestinal tract AND oesophagus (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

CREATE TABLE tr\_av\_stomach AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS stomach\_avtreat

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('G421','G146','G449') AND tc.tumour\_code IN ('C16'))

WHERE rk=1));

--8)---------------- STOMACH C16 - HES ------------------

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4\_code is a fibreoptic endoscopic resection of lesions of upper gastrointestinal tract AND oesophagus (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1a (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

CREATE TABLE tr\_hes\_stomach AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS stomach\_hes

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('G421','G146','G449') AND tc.tumour\_code IN ('C16'))

WHERE rk=1));

--------------------------------------------------------------------------------

--9)---------------- BLADDER CANCERS (C67) - AT\_TREATMENT\_ENGLAND--------------

-- Create a surgery flag for the tumour if:

-- there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is a endoscopic resections of lesion of bladder (TURBT) (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is T1 (non-muscle invasive) (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

CREATE TABLE tr\_av\_bladder AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS bladder1\_avtreat

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('M421', 'M422', 'M423', 'M428', 'M429') AND tc.tumour\_code IN ('C67'))

WHERE rk=1));

--10)---------------- BLADDER CANCERS (C67) - HES ------------------------

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4\_code is an endoscopic resections of lesion of bladder (TURBT) (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is T1 (non-muscle invasive) (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

CREATE TABLE tr\_hes\_bladder AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS bladder1\_hes

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('M421', 'M422', 'M423', 'M428', 'M429') AND tc.tumour\_code IN ('C67'))

WHERE rk=1));

--------------------------------------------------------------------------------

--11)---------------- CERVICAL CANCERS; CONE BIOPSIES - AT\_TREATMENT\_ENGLAND ------------------

--The final treatment table will create a surgery flag for the tumour if:

--The tumour received a cone biopsy and was FIGO stage 1a (see SOP Appendices for list of opcs4 codes)

--Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

--Tables 11-14 flag the cone biopsies and lymphadenectomies, AND a cervical tumour resection flag will bring this together in the final table

-- Create a cone biopsy flag for the tumour if:

-- there is a record in at\_treatment\_england which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is a cone biopsy

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

CREATE TABLE tr\_av\_conebiops AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS conebiops\_avtreat

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('Q014','Q033','Q031','Q032') AND tc.tumour\_code='C53')

WHERE rk=1));

--12)---------------- CERVICAL CANCERS; CONE BIOPSIES - HES ------------------

-- Create a cone biopsy flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4\_code is a cone biopsy (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the patient only had one tumour in the time period of interest (this is incorporated in the final table)

CREATE TABLE tr\_hes\_conebiops AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS conebiops\_hes

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('Q014','Q033','Q031','Q032') AND tc.tumour\_code='C53')

WHERE rk=1));

--13)---------------- CERVICAL CANCERS; LYMPHADENECTOMIES - AT\_TREATMENT\_ENGLAND ------------------

-- Create a lymphadenectomy flag for the tumour if:

-- there is a record in at\_treatment\_england which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is a lymphadenectomy (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

CREATE TABLE tr\_av\_lymph AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS lymph\_avtreat

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('T856','T859','T865') AND tc.tumour\_code='C53')

WHERE rk=1));

--14)---------------- CERVICAL CANCERS; LYMPHADENECTOMIES - HES ------------------

-- Create a lymphadenectomy flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- And the opcs4\_code is a lymphadenectomy (see SOP Appendices for list of opcs4 codes)

-- And the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- And the patient only had one tumour in the time period of interest (this is incorporated in the final table)

CREATE TABLE tr\_hes\_lymph AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS lymph\_hes

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,pos) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('T856','T859','T865') AND tc.tumour\_code='C53')

WHERE rk=1));

--------------------------------------------------------------------------------

--15)---------------- COLORECTAL CANCERS; ENDOSCOPIES - AT\_TREATMENT\_ENGLAND---------

-- Create a surgery flag for the tumour if:

-- there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- and the opcs4\_code is an endoscopic resection or endoscopic biopsy procedure (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

CREATE TABLE tr\_av\_colorec AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec\_avtreat

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('H201','H412','H206','H231','H236','H205','H202','H122','H235','H239','H402','H232','H261','H208','H341','H418',

'H209','H248','H238','H204','H419','H221','H251','H259','H229','H181','H281','H191','H561')

AND tc.tumour\_code in ('C18', 'C19', 'C20'))

WHERE rk=1));

--16)---------------- COLORECTAL CANCERS; ENDOSCOPIES - HES ------------------

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4\_code is an endoscopic resection or endoscopic biopsy procedure (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is TNM stage 1 (a stage-specific tumour resection flag will incorporate this stage criteria in the final table)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

CREATE TABLE tr\_hes\_colorec AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec\_hes

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('H201','H412','H206','H231','H236','H205','H202','H122','H235','H239','H402','H232', 'H261','H208','H341',

'H418','H209','H248','H238','H204','H419','H221','H251','H259','H229','H181','H281','H191','H561')

AND tc.tumour\_code in ('C18', 'C19', 'C20'))

WHERE rk=1));

--17)---------------- COLORECTAL CANCERS; APPENDECTOMIES FOR APPENDIX TUMOURS ONLY C18.1 - AT\_TREATMENT\_ENGLAND ------------------

-- Create a surgery flag for the tumour if:

-- there is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with surgery (event is '01a', '01b', '01z', or '01c')

-- And the opcs4\_code is an appendectomy procedure (see SOP Appendices for list of opcs4 codes)

-- And the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- And the tumour is an appendix tumour (C18.1)

CREATE TABLE tr\_av\_coloappen AS

(SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec\_avtreat\_appen

, eventdate AS avsg\_date

, avsg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avsg\_trust\_code

FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk, avtreat.eventdate

, avtreat.trust\_code AS avsg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('01a','01b','01z','01c') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time)

AND avtreat.opcs4\_code IN ('H024','H019','H011') AND tc.site\_icd10\_o2 in ('C181'))

WHERE rk=1));

--18)---------------- COLORECTAL CANCERS; APPENDECTOMIES FOR APPENDIX TUMOURS ONLY C18.1 - HES ------------------

-- Create a surgery flag for the tumour if:

-- There is an inpatient hes episode with a tumour resection opcs-4 code in one of the operation fields

-- and the opcs4\_code is an appendectomy procedure (see SOP Appendices for list of opcs4 codes)

-- and the operation date (opertn) occurred in the relevant timeframe (see SOP)

-- and the tumour is an appendix tumour (C18.1)

-- and the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

CREATE TABLE

tr\_hes\_coloappen AS (

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS colorec\_hes\_appen

, opdate AS hessg\_date

, hessg\_trust\_code

FROM (

SELECT tumourid, datediff, rk, opdate, hessg\_trust\_code FROM (

SELECT tc.tumourid,

ho.opdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY ho.opdate, hl.datayear,hl.epikeyanon,POS) AS rk

, ho.opdate

, procode3 AS hessg\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN heslive.hes\_linkage\_av\_apc@casref01 hl ON tc.patientid = hl.patientid

INNER JOIN heslive.hesapc@casref01 ha ON ha.datayear = hl.datayear AND ha.epikeyanon = hl.epikeyanon

INNER JOIN heslive.hesapc\_opertn@casref01 ho ON ho.datayear = hl.datayear AND ho.epikeyanon = hl.epikeyanon

AND ho.opdate-tc.diagnosisdatebest BETWEEN -31 AND tim.resect\_time

AND ho.opertn IN ('H024','H019','H011') AND tc.site\_icd10\_o2 in ('C181'))

WHERE rk=1));

------------------------------------------------------------------------------

------------------------ CREATE CHEMO FLAG TABLES -------------------------

------------------------------------------------------------------------------

--19)---------------- ALL SITES - AVCT TABLE -------------------------------

-- Create a chemo flag for the tumour if:

-- There is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with chemotherapy (event is either 'Cytotoxic Chemotherapy' (code = 02) or 'CT - Other' (code = CTX) or ‘chemoradiotherapy’ (code = 04) or ‘radioisotope therapy (including radioiodine)’ (code = 19) or 'Immunotherapy' (code = 15))

-- AND the event date (eventdate) occurred in the relevant timeframe (see SOP)

CREATE TABLE tr\_av\_ct AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS avct\_flag

, eventdate AS avct\_date

, avct\_trust\_code

FROM (

SELECT tumourid, datediff, rk ,eventdate, avct\_trust\_code FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk

, avtreat.eventdate

, avtreat.trust\_code AS avct\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('02','04','15','19','CTX') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.CHEMO\_TIME)

)

WHERE rk=1));

--20)----------------ALL SITES - SACT LEGACY -- UP TO 30th JUNE 2017 -------------------------------------

-- Create a chemo flag for the tumour if:

-- there is a record in SACT LEGACY (excluding those null or classified as 'hormones' or 'Not chemo' or 'Zoledronic acid' or 'Pamidronate' or 'Denosumab')

-- AND the start date of the regimen (start\_date\_of\_regimen) occurred in the relevant timeframe

-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

-- AND the start date of the regimen is up to 30th June 2017

CREATE TABLE tr\_sact AS (

SELECT DISTINCT tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS sact\_flag

, start\_date\_of\_regimen AS sact\_date

, sact\_trust\_code

FROM ( SELECT tumourid,datediff,rk , start\_date\_of\_regimen, sact\_trust\_code

FROM ( SELECT tc.tumourid, sr.start\_date\_of\_regimen-tc.diagnosisdatebest AS datediff, RANK() OVER (PARTITION BY tc.tumourid ORDER BY sr.start\_date\_of\_regimen, sr.merged\_regimen\_id, st.merged\_tumour\_id) AS rk

, sr.start\_date\_of\_regimen

, SUBSTR(st.organisation\_code\_of\_provider,1,3) AS sact\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN sact\_legacy.patient@casref01 sp ON tc.nhsnumber=sp.nhs\_number

INNER JOIN sact\_legacy.tumour@casref01 st ON sp.merged\_patient\_id=st.merged\_patient\_id

INNER JOIN sact\_legacy.regimen@casref01 SR on st.merged\_tumour\_id=sr.merged\_tumour\_id

AND (NOT (benchmark\_group IN ('NOT CHEMO','HORMONES','ZOLEDRONIC ACID','PAMIDRONATE','DENOSUMAB') OR benchmark\_group IS NULL))

AND sr.start\_date\_of\_regimen-tc.diagnosisdatebest BETWEEN -31 AND tim.chemo\_time

AND sr.start\_date\_of\_regimen<=TO\_DATE('2017-06-30','YYYY-MM-DD')

) WHERE rk=1

));

--21)-----------ALL SITES - SACT ENCORE -- FROM 1 JULY 2017 ----------------------------

-- Create a chemo flag for the tumour if:

-- there is a record in SACT ENCORE (excluding those null or classified as 'hormones' or 'Not chemo' or 'Zoledronic acid' or 'Pamidronate' or 'Denosumab')

-- AND the start date of the regimen (start\_date\_of\_regimen) occurred in the relevant timeframe

-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

-- AND the start date of the regimen is from 1 July 2017 onwards

CREATE TABLE tr\_sact\_2 AS

(SELECT

DISTINCT tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS sact2\_flag,

start\_date\_of\_regimen AS sact2\_date

, sact2\_trust\_code

FROM (SELECT /\*+ USE\_HASH(tc tim) USE\_HASH(tim sp) USE\_HASH(sp st) USE\_HASH(st sr)\*/

tumourid, datediff ,rk, start\_date\_of\_regimen, sact2\_trust\_code

 FROM (SELECT tc.tumourid,

 sr.start\_date\_of\_regimen-tc.diagnosisdatebest AS datediff, RANK() OVER (PARTITION BY tc.tumourid ORDER BY sr.start\_date\_of\_regimen, sr.merged\_regimen\_id, st.sact\_tumour\_id) AS rk,

 sr.start\_date\_of\_regimen, SUBSTR(st.organisation\_code\_of\_provider,1,3) AS sact2\_trust\_code

 FROM tr\_tumour\_cohort tc

 INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 TIM ON TIM.tumouricdsite3code = tc.tumour\_code

 INNER JOIN sact.at\_patient\_england@cas2211 sp ON tc.nhsnumber=sp.nhs\_number

 INNER JOIN sact.at\_tumour\_england@cas2211 st ON sp.encore\_patient\_id = st.encore\_patient\_id

 INNER JOIN sact.at\_regimen\_england@cas2211 sr ON st.sact\_tumour\_id=sr.sact\_tumour\_id

 AND (NOT (benchmark\_group IN ('NOT CHEMO','HORMONES','ZOLEDRONIC ACID','PAMIDRONATE','DENOSUMAB') OR benchmark\_group IS NULL))

 AND sr.start\_date\_of\_regimen-tc.diagnosisdatebest BETWEEN -31 AND TIM.chemo\_time

 AND sr.start\_date\_of\_regimen>=TO\_DATE('2017-07-01','YYYY-MM-DD')

 )

 WHERE rk=1

 ));

------------------------------------------------------------------------------

---------------- CREATE RADIOTHERAPY FLAG TABLES ------------------

------------------------------------------------------------------------------

--22)---------------- ALL SITES - AT\_TREATMENT\_ENGLAND ------------------

-- Create a radiotherapy flag for the tumour if:

-- There is a record in AT\_TREATMENT\_ENGLAND which states that the tumour was treated with radiotherapy

--(event is either 'RT - Teletherapy' (code = 05) or ‘chemoradiotherapy’ (code = 04) or ‘radiosurgery’ (code = 22) or 'RT - Other/ NK' (code = RTX))

-- AND the event date (eventdate) occurred in the relevant timeframe (see SOP)

CREATE TABLE tr\_av\_rt AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS avrt\_flag

, eventdate AS avrt\_date

, avrt\_trust\_code

FROM (

SELECT tumourid, datediff, rk, eventdate, avrt\_trust\_code FROM (

SELECT tc.tumourid,

avtreat.eventdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY avtreat.eventdate, avtreat.eventid) AS rk

, avtreat.eventdate

, avtreat.trust\_code AS avrt\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN av2019.at\_treatment\_england@casref01 avtreat ON avtreat.tumourid=tc.tumourid

AND eventcode IN ('04','05','22','RTX') AND (avtreat.eventdate-tc.diagnosisdatebest BETWEEN -31 AND tim.RADIO\_TIME)

)

WHERE rk=1

));

--23)---------------ALL SITES - RTDS PRE APRIL 2016 (COLLECTED BY NATCANSAT)-----------

-- Create a radiotherapy flag for the tumour if:

-- There is a record in rtds (excluding those classed as Brachytherapy, i.e., with RTTREATMENTMODALITY='06')

-- AND the appointment date (APPTDATE) occurred in the relevant timeframe

-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

CREATE TABLE

tr\_rtds

AS(

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS rtds\_flag

, apptdate AS rtds\_date

, rtds\_trust\_code

FROM (

SELECT tumourid,datediff,rk , apptdate, rtds\_trust\_code FROM (

SELECT tc.tumourid, rl.apptdate-tc.diagnosisdatebest AS datediff,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY rl.apptdate,rl.attendid,rl.orgcodeprovider,pr.radiotherapyepisodeid,pr.prescriptionid) AS rk

, rl.apptdate

, CAST(SUBSTR(pr.orgcodeprovider,1,3) AS VARCHAR(3)) AS rtds\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN rtds2016.opcds\_cas1712\_linkage rl ON tc.patientid=rl.patientid AND rl.apptdate-tc.diagnosisdatebest BETWEEN -31 AND tim.radio\_time

INNER JOIN rtds2016.rtds\_prescriptions pr ON pr.orgcodeprovider = rl.orgcodeprovideR AND pr.attendid = rl.attendid

AND pr.apptdate = rl.apptdate AND pr.rttreatmentmodality NOT IN ('06')

)

WHERE rk=1

)

);

--24)--------------- ALL SITES - RTDS POST APRIL 2016 (COLLECTED BY NCRAS; PROCESSED BY ENCORE) -----------------

-- Create a radiotherapy flag for the tumour if:

-- There is a record in rtds (excluding those classed as Brachytherapy, i.e., with RTTREATMENTMODALITY='06')

-- AND the appointment date (APPTDATE) occurred in the relevant timeframe

-- AND the patient only had one tumour in the time period of interest (this is also incorporated in the final table)

-- Do not flag the patient as receiving radiotherapy if the appointment date was before 1st April 2016

CREATE TABLE

tr\_rtds\_2 AS (

SELECT DISTINCT

tumourid,

CASE WHEN datediff IS NULL THEN 0 ELSE 1 END AS rtds2\_flag

, TO\_DATE(apptdate) AS rtds2\_date

, rtds2\_trust\_code

FROM (

SELECT tumourid,datediff,rk, apptdate, rtds2\_trust\_code FROM (

SELECT tc.tumourid, TO\_DATE(pr.apptdate)-tc.diagnosisdatebest AS datediff

, TO\_DATE(pr.apptdate) AS apptdate,

RANK() OVER (PARTITION BY tc.tumourid ORDER BY TO\_DATE(pr.apptdate),pr.attendid,pr.orgcodeprovider,pr.radiotherapyepisodeid,pr.prescriptionid) AS rk

, pr.orgcodeprovider AS rtds2\_trust\_code

FROM tr\_tumour\_cohort tc

INNER JOIN analysislouisereynolds.timeframe\_lookup\_13\_19@casref01 tim ON tim.tumouricdsite3code = tc.tumour\_code

INNER JOIN rtds.at\_prescriptions\_england@cas2211 pr ON pr.patientid=tc.patientid AND pr.rttreatmentmodality NOT IN ('06')

AND pr.orgcodeprovider <>'7A3'

AND TO\_DATE(pr.apptdate)-tc.diagnosisdatebest BETWEEN -31 AND tim.radio\_time AND TO\_DATE(pr.apptdate) BETWEEN TO\_DATE('01-APR-16', 'dd-mm-yy') AND TO\_DATE('31-DEC-20 23:59:00', 'DD/MM/YY HH24:MI:SS')

)

WHERE rk=1

)

);

------------------------------------------------------------------------------

------------------ Index the tables from above---------------------------------

-------------------------------------------------------------------------------

CREATE UNIQUE INDEX analysislouisereynolds.tr\_AVCT\_tumourid\_uq ON analysislouisereynolds.tr\_av\_CT ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_AVRT\_tumourid\_uq ON analysislouisereynolds.tr\_av\_RT ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_AVSG\_tumourid\_uq ON analysislouisereynolds.tr\_av\_sg ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_bladder1\_tumourid\_uq ON analysislouisereynolds.tr\_av\_bladder ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_coloappen\_tumourid\_uq ON analysislouisereynolds.tr\_av\_coloappen ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_colorec\_tumourid\_uq ON analysislouisereynolds.tr\_av\_colorec ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_conebiops\_tumourid\_uq ON analysislouisereynolds.tr\_av\_conebiops ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_liver\_tumourid\_uq ON analysislouisereynolds.tr\_av\_liver ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_lymph\_tumourid\_uq ON analysislouisereynolds.tr\_av\_lymph ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_oesoph\_tumourid\_uq ON analysislouisereynolds.tr\_av\_oesoph ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_av\_stomach\_tumourid\_uq ON analysislouisereynolds.tr\_av\_stomach ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_CT')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_AVCT\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_RT')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_AVRT\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_sg')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_AVSG\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_bladder')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_bladder1\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_coloappen')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_coloappen\_tumid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_colorec')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_colorec\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_conebiops')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_conebiops\_tumid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_liver')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_liver\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_lymph')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_lymph\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_oesoph')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_oesoph\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_av\_stomach')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_av\_stomach\_tumourid\_uq')

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_sg\_tumourid\_uq ON analysislouisereynolds.tr\_hes\_sg ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_bladder1\_tumid\_uq ON analysislouisereynolds.tr\_hes\_bladder ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_coloappen\_tumid\_uq ON analysislouisereynolds.tr\_hes\_coloappen ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_colorec\_tumourid\_uq ON analysislouisereynolds.tr\_hes\_colorec ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_conebiops\_tumid\_uq ON analysislouisereynolds.tr\_hes\_conebiops ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_liver\_tumourid\_uq ON analysislouisereynolds.tr\_hes\_liver ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_lymph\_tumourid\_uq ON analysislouisereynolds.tr\_hes\_lymph ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_oesoph\_tumourid\_uq ON analysislouisereynolds.tr\_hes\_oesoph ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_hes\_stomach\_tumourid\_uq ON analysislouisereynolds.tr\_hes\_stomach ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_rtds\_tumourid\_uq ON analysislouisereynolds.tr\_rtds ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_rtds\_2\_tumourid\_uq ON analysislouisereynolds.tr\_rtds\_2 ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_sact\_tumourid\_uq ON analysislouisereynolds.tr\_sact ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

CREATE UNIQUE INDEX analysislouisereynolds.tr\_sact\_2\_tumourid\_uq ON analysislouisereynolds.tr\_sact\_2 ( tumourid ) NOLOGGING TABLESPACE analysisdata\_IX;

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_sg')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_sg\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_bladder')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_bladder1\_tumid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_coloappen')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_coloappen\_tumid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_colorec')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_colorec\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_conebiops')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_conebiops\_tumid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_liver')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_liver\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_lymph')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_lymph\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_oesoph')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_oesoph\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_hes\_stomach')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_hes\_stomach\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_rtds')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_rtds\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_rtds\_2')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_rtds\_2\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_sact')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_sact\_tumourid\_uq')

EXECUTE dbms\_stats.gather\_table\_stats('analysislouisereynolds', 'tr\_sact\_2')

EXECUTE dbms\_stats.gather\_index\_stats('analysislouisereynolds', 'tr\_sact\_2\_tumourid\_uq')

------------------------------------------------------------------------------

----------- Create final table drawing on all previous tables------------------

------------------------------------------------------------------------------

CREATE TABLE av\_treatment\_1319\_4p7 NOLOGGING COMPRESS

AS

SELECT

--Create radiotherapy (RT) flag for the tumour

--Only use the patient level datasets (rtds, rtds2) if the patient had no other tumours recorded in the 18 months before or after this tumour diagnosis

CASE

WHEN avrt\_flag=1 THEN 1

WHEN rtds\_flag=1 AND tc.tumour\_flag=0 THEN 1

WHEN rtds2\_flag=1 AND tc.tumour\_flag=0 THEN 1

ELSE 0

END AS rt\_flag

--------------------------------------------------------------------------------

--Create chemo (CT) flag for the tumour

--Only use the patient level datasets (sact, sact2) if the patient had no other tumours recorded in the 18 months before or after this tumour diagnosis

,CASE

WHEN avct\_flag=1 THEN 1

WHEN sact\_flag=1 AND tc.tumour\_flag=0 THEN 1

WHEN sact2\_flag=1 AND tc.tumour\_flag=0 THEN 1

ELSE 0

END AS ct\_flag

--------------------------------------------------------------------------------

--Create resection flag for the tumour

--Only use the patient level datasets (hes) if the patient had no other tumours recorded in the 18 months before or after this tumour diagnosis

,CASE

-- Firstly, incorporate non-stage specific resection flag using opcs4 resection lookup table

WHEN AVSG\_flag=1 THEN 1

WHEN hessg\_flag=1 AND tc.tumour\_flag=0 THEN 1

-- Secondly, incorporate stage specific rules for particular cancer sites

--Cervical

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(SUBSTR(tc.figo,1,2))) IN ('1A','IA') AND conebiops\_avtreat=1 THEN 1

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(SUBSTR(tc.figo,1,2))) IN ('1A','IA') AND conebiops\_hes=1 AND tc.tumour\_flag=0 THEN 1

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_avtreat=1) AND (lymph\_avtreat=1) THEN 1

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_avtreat=1) AND (lymph\_hes=1 AND tc.tumour\_flag=0) THEN 1

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_hes=1 AND tc.tumour\_flag=0) AND (lymph\_avtreat=1) THEN 1

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_hes=1 AND tc.tumour\_flag=0) AND (lymph\_hes=1 AND tc.tumour\_flag=0) THEN 1

--colorectal:

WHEN avt.site\_icd10\_o2\_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage\_best,1,1)='1' AND colorec\_avtreat=1 THEN 1

WHEN avt.site\_icd10\_o2\_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage\_best,1,1)='1' AND colorec\_hes=1 AND tc.tumour\_flag=0 THEN 1

--Sub rule for appendectomies for colorectal:

WHEN avt.site\_icd10\_o2 IN ('C181') AND colorec\_avtreat\_appen=1 THEN 1

WHEN avt.site\_icd10\_o2 IN ('C181') AND colorec\_hes\_appen=1 AND tc.tumour\_flag=0 THEN 1

--bladder

WHEN avt.site\_icd10\_o2\_3char IN ('C67') AND SUBSTR(avt.t\_best, 1,1) = '1' AND bladder1\_avtreat=1 THEN 1

WHEN avt.site\_icd10\_o2\_3char IN ('C67') AND SUBSTR(avt.t\_best, 1,1) = '1' AND bladder1\_hes=1 AND tc.tumour\_flag=0 THEN 1

-- liver

WHEN avt.site\_icd10\_o2\_3char IN ('C22') AND SUBSTR(avt.stage\_best,1,1)='1' AND liver\_avtreat=1 THEN 1

WHEN avt.site\_icd10\_o2\_3char IN ('C22') AND SUBSTR(avt.stage\_best,1,1)='1' AND liver\_hes=1 AND tc.tumour\_flag=0 THEN 1

-- oesophagus

WHEN avt.site\_icd10\_o2\_3char IN ('C15') AND SUBSTR(avt.stage\_best, 1,2)='1A' AND oesoph\_avtreat=1 THEN 1

WHEN avt.site\_icd10\_o2\_3char IN ('C15') AND SUBSTR(avt.stage\_best,1,2)='1A' AND oesoph\_hes=1 AND tc.tumour\_flag=0 THEN 1

-- stomach

WHEN avt.site\_icd10\_o2\_3char IN ('C16') AND SUBSTR(avt.stage\_best,1,2)='1A' AND stomach\_avtreat=1 THEN 1

WHEN avt.site\_icd10\_o2\_3char IN ('C16') AND SUBSTR(avt.stage\_best,1,2)='1A' AND stomach\_hes=1 AND tc.tumour\_flag=0 THEN 1

ELSE 0

END AS sg\_flag

--------------------------------------------------------------------------------

--Create cancer site names

,CASE WHEN tumour\_code IN ('C67') THEN 'BLADDER'

WHEN tumour\_code IN ('C50') THEN 'BREAST'

WHEN tumour\_code IN ('C53') THEN 'CERVICAL'

WHEN tumour\_code IN ('C18','C19') THEN 'COLON'

WHEN tumour\_code IN ('C20') THEN 'RECTUM'

WHEN tumour\_code IN ('C01', 'C09', 'C10') THEN 'OROPHARYNX'

WHEN tumour\_code IN ('C02', 'C03', 'C04', 'C06') THEN 'ORAL\_CAVITY'

WHEN tumour\_code IN ('C07', 'C08') THEN 'SALIVARY\_GLANDS'

WHEN tumour\_code IN ('C12', 'C13') THEN 'HYPOPHARYNX'

WHEN tumour\_code IN ('C32') THEN 'LARYNX'

WHEN tumour\_code IN ('C05', 'C11', 'C14', 'C30', 'C31') THEN 'OTHER\_HEAD\_AND\_NECK'

WHEN tumour\_code IN ('C64', 'C65', 'C66', 'C68') THEN 'KIDNEY'

WHEN tumour\_code IN ('C22') THEN 'LIVER'

WHEN tumour\_code IN ('C33', 'C34') AND tc.morph\_icd10\_o2 IN ('8041','8042','8043','8044','8045') THEN 'SCLC'

WHEN tumour\_code IN ('C33', 'C34') AND tc.morph\_icd10\_o2 NOT IN ('8041','8042','8043','8044','8045') THEN 'NSCLC'

WHEN tumour\_code IN ('C25') THEN 'PANCREAS'

WHEN tumour\_code IN ('C61') THEN 'PROSTATE'

WHEN tumour\_code IN ('C15') THEN 'OESOPHAGUS'

WHEN tumour\_code IN ('C56', 'C57','C48OVARY', 'D39OVARY') THEN 'OVARY'

WHEN tumour\_code IN ('C16') THEN 'STOMACH'

WHEN tumour\_code IN ('C54', 'C55') THEN 'UTERINE'

WHEN tumour\_code IN ('C51') THEN 'VULVA'

WHEN tumour\_code IN ('C70', 'C71', 'C72') THEN 'MALIGNANT BRAIN'

WHEN tumour\_code IN ('D32BRAIN', 'D33BRAIN', 'D42BRAIN', 'D43BRAIN') THEN 'NON-MALIGNANT BRAIN'

WHEN tumour\_code IN ('D35BRAIN') THEN 'BENIGN ENDOCRINE'

WHEN tumour\_code IN ('C75BRAIN', 'D44BRAIN') THEN 'NON-BENIGN ENDOCRINE'

WHEN tumour\_code IN ('C62', 'D29TESTES') THEN 'TESTES'

WHEN tumour\_code IN ('NON-KC\_MELANOMA') THEN 'SKIN:NON-KERATINOCYTE, MELANOMA'

WHEN tumour\_code IN ('NON-KC\_RARE') THEN 'SKIN:NON-KERATINOCYTE, RARE'

WHEN tumour\_code IN ('KC\_BCC') THEN 'SKIN:KERATINOCYTE SKIN, BCC'

WHEN tumour\_code IN ('KC\_CSCC') THEN 'SKIN:KERATINOCYTE, CSCC'

WHEN SUBSTR(tumour\_code,1,1)='D' AND tumour\_code NOT IN ('D01','D04','D03','D06','D07','D11','D13','D15','D16','D18','D25','D27','D36','D40','D48','D29TESTES', 'D32BRAIN', 'D33BRAIN', 'D35BRAIN', 'D39OVARY', 'D39OVARY', 'D42BRAIN', 'D43BRAIN', 'D44BRAIN') THEN 'OTHER NON-MALIGNANT'

ELSE 'OTHER MALIGNANT'

END AS cancergroup

,CASE

WHEN ncr.cal19nm = 'National Cancer Vanguard: Greater Manchester' THEN 'Greater Manchester'

WHEN ncr.cal19nm = 'National Cancer Vanguard: North Central AND North East London' THEN 'North Central AND North East London'

WHEN ncr.cal19nm = 'National Cancer Vanguard: North West AND South West London' THEN 'North West AND South West London'

WHEN ncr.cal19nm = 'West Yorkshire' THEN 'West Yorkshire AND Harrogate'

ELSE ncr.cal19nm

END AS cal19nm

-- Select all other variables

,avt.tumourid

,avt.diagnosisyear

,avt.age

,avt.sex

,avt.dco

,avt.basisofdiagnosis

,atg.ccg\_2021\_code

,atg.gor\_code

,avt.fiveyearageband

,avt.ethnicity

,chrl.chrl\_tot\_27\_03

,imd.imd19\_quintile\_lsoas

,ncr.cal19cd

--For checking

,avt.morph\_icd10\_o2

,tc.figo

,avt.t\_best

,avt.stage\_best

,tc.site\_icd10\_o2

,site\_icd10\_o2\_3char

,tc.tumour\_flag

------------------------------------------------------------------------------------------------------------

--Select dates of treatment from at\_treatment\_england

,avt.diagnosisdatebest

,avt.deathdatebest

,avct.avct\_date

,avrt.avrt\_date

,avsg.avsg\_date

--Select dates of treatment from patient-level datasets where only 1 tumour was diagnosed in 18 months before or after that tumour

,CASE WHEN tc.tumour\_flag=0 THEN sact.sact\_date END AS sact\_date

,CASE WHEN tc.tumour\_flag=0 THEN sact2.sact2\_date END AS sact2\_date

,CASE WHEN tc.tumour\_flag=0 THEN rtds.rtds\_date END AS rtds\_date

,CASE WHEN tc.tumour\_flag=0 THEN hessg.hessg\_date END AS hessg\_date

,CASE WHEN tc.tumour\_flag=0 THEN rtds2.rtds2\_date END AS rtds2\_date

------------------------------------------------------------------------------------------------------------

--Select date of surgery where there were additional site-specific resections flagged:

------------------CERVICAL------------------

-- Take date of cone biopsy in at\_treatment\_england if:

-- The tumour received a cone biopsy and was FIGO stage 1a

-- Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

, CASE

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND conebiops\_avtreat=1 THEN cbavt.avsg\_date

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_avtreat=1) AND (lymph\_avtreat=1) THEN cbavt.avsg\_date

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_avtreat=1) AND (lymph\_hes=1 AND tc.tumour\_flag=0) THEN cbavt.avsg\_date

END AS cbavsg\_date

-- Take date of cone biopsy in hes if:

--The tumour received a cone biopsy and was FIGO stage 1a

--Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

--and only 1 tumour was diagnosed in 18 months before or after that tumour

, CASE

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND conebiops\_hes=1 AND tc.tumour\_flag=0 THEN cbhes.hessg\_date

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_hes=1 AND tc.tumour\_flag=0) AND (lymph\_avtreat=1) THEN cbhes.hessg\_date

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_hes=1 AND tc.tumour\_flag=0) AND (lymph\_hes=1 AND tc.tumour\_flag=0) THEN cbhes.hessg\_date

END AS cbhessg\_date

---------------colorectal---------------------------------

-- As with cervical, select the date of the stage-specific resection for each tumour, according to the rules specified earlier for generating the stage-specific resection flag for that tumour site

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage\_best,1,1)='1' AND colorec\_avtreat=1 THEN coloavt.avsg\_date

END AS coloavsg\_date

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage\_best,1,1)='1' AND colorec\_hes=1 AND tc.tumour\_flag=0 THEN colohes.hessg\_date

END AS colohessg\_date

,CASE WHEN avt.site\_icd10\_o2 IN ('C181') AND colorec\_avtreat\_appen=1 THEN coloavt\_appen.avsg\_date

END AS appenavsg\_date

, CASE WHEN avt.site\_icd10\_o2 IN ('C181') AND colorec\_hes\_appen=1 AND tc.tumour\_flag=0 THEN colohes\_appen.hessg\_date

END AS appenhessg\_date

---------------bladder---------------------------------

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C67') AND SUBSTR(avt.t\_best, 1,1) = '1' AND bladder1\_avtreat=1 THEN blad1\_avt.avsg\_date

END AS bladavsg\_date

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C67') AND SUBSTR(avt.t\_best, 1,1) = '1' AND bladder1\_hes=1 AND tc.tumour\_flag=0 THEN blad1\_hes.hessg\_date

END AS bladhessg\_date

---------------liver---------------------------------

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C22') AND SUBSTR(avt.stage\_best,1,1)='1' AND liver\_avtreat=1 THEN livavt.avsg\_date

END AS livavsg\_date

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C22') AND SUBSTR(avt.stage\_best,1,1)='1' AND liver\_hes=1 AND tc.tumour\_flag=0 THEN livhes.hessg\_date

END AS livhessg\_date

---------------oesophageal---------------------------------

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C15') AND SUBSTR(avt.stage\_best,1,2)='1A' AND oesoph\_avtreat=1 THEN oesoavt.avsg\_date

END AS oesoavsg\_date

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C15') AND SUBSTR(avt.stage\_best,1,2)='1A' AND oesoph\_hes=1 AND tc.tumour\_flag=0 THEN oesohes.hessg\_date

END AS oesohessg\_date

---------------stomach---------------------------------

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C16') AND SUBSTR(avt.stage\_best,1,2)='1A' AND stomach\_avtreat=1 THEN stomavt.avsg\_date

END AS stomavsg\_date

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C16') AND SUBSTR(avt.stage\_best,1,2)='1A' AND stomach\_hes=1 AND tc.tumour\_flag=0 THEN stomhes.hessg\_date

END AS stomhessg\_date

------------------------------------------------------------------------------------------------------------

--Select trust codes from at\_treatment\_england

, avsg.avsg\_trust\_code

, avct\_trust\_code

, avrt\_trust\_code

--Select trust codes of treatment from patient-level datasets where only 1 tumour was diagnosed in 18 months before or after that tumour

,CASE WHEN tc.tumour\_flag=0 THEN hessg.hessg\_trust\_code END AS hessg\_trust\_code

,CASE WHEN tc.tumour\_flag=0 THEN sact.sact\_trust\_code END AS sact\_trust\_code

,CASE WHEN tc.tumour\_flag=0 THEN sact2.sact2\_trust\_code END AS sact2\_trust\_code

,CASE WHEN tc.tumour\_flag=0 THEN rtds.rtds\_trust\_code END AS rtds\_trust\_code

,CASE WHEN tc.tumour\_flag=0 THEN rtds2.rtds2\_trust\_code END AS rtds2\_trust\_code

------------------------------------------------------------------------------------------------------------

--Select trust codes of surgery where there were additional site-specific resections flagged:

------------------CERVICAL------------------

-- Take trust code of cone biopsy in at\_treatment\_england if:

-- The tumour received a cone biopsy and was FIGO stage 1a

-- Or the tumour received a cone biopsy and was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

, CASE

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND conebiops\_avtreat=1 THEN cbavt.avsg\_trust\_code

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_avtreat=1) AND (lymph\_avtreat=1) THEN cbavt.avsg\_trust\_code

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_avtreat=1) AND (lymph\_hes=1 AND tc.tumour\_flag=0) THEN cbavt.avsg\_trust\_code

END AS cbavsg\_trust\_code

-- Take date of cone biopsy in hes if:

--The tumour received a cone biopsy AND was FIGO stage 1a

--Or the tumour received a cone biopsy AND was FIGO stage 1b & 1b1 disease, if the tumour also received a lymphadenectomy

--AND only 1 tumour was diagnosed in 18 months before or after that tumour

, CASE

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(SUBSTR(tc.figo,1,2)) IN ('1A','IA')) AND conebiops\_hes=1 AND tc.tumour\_flag=0 THEN cbhes.hessg\_trust\_code

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_hes=1 AND tc.tumour\_flag=0) AND (lymph\_avtreat=1) THEN cbhes.hessg\_trust\_code

WHEN avt.site\_icd10\_o2\_3char='C53' AND (upper(tc.figo) IN ('1B','IB') or upper(SUBSTR(tc.figo,1,3)) IN ('1B1','IB1')) AND (conebiops\_hes=1 AND tc.tumour\_flag=0) AND (lymph\_hes=1 AND tc.tumour\_flag=0) THEN cbhes.hessg\_trust\_code

END AS cbhessg\_trust\_code

---------------colorectal---------------------------------

-- As with cervical, select the date of the stage-specific resection for each tumour, according to the rules specified earlier for generating the stage-specific resection flag for that tumour site

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage\_best,1,1)='1' AND colorec\_avtreat=1 THEN coloavt.avsg\_trust\_code

END AS coloavsg\_trust\_code

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C18','C19','C20') AND SUBSTR(avt.stage\_best,1,1)='1' AND colorec\_hes=1 AND tc.tumour\_flag=0 THEN colohes.hessg\_trust\_code

END AS colohessg\_trust\_code

,CASE WHEN avt.site\_icd10\_o2 IN ('C181') AND colorec\_avtreat\_appen=1 THEN coloavt\_appen.avsg\_trust\_code

END AS appenavsg\_trust\_code

, CASE WHEN avt.site\_icd10\_o2 IN ('C181') AND colorec\_hes\_appen=1 AND tc.tumour\_flag=0 THEN colohes\_appen.hessg\_trust\_code

END AS appenhessg\_trust\_code

---------------bladder---------------------------------

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C67') AND SUBSTR(avt.t\_best, 1,1) = '1' AND bladder1\_avtreat=1 THEN blad1\_avt.avsg\_trust\_code

END AS bladavsg\_trust\_code

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C67') AND SUBSTR(avt.t\_best, 1,1) = '1' AND bladder1\_hes=1 AND tc.tumour\_flag=0 THEN blad1\_hes.hessg\_trust\_code

END AS bladhessg\_trust\_code

---------------liver---------------------------------

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C22') AND SUBSTR(avt.stage\_best,1,1)='1' AND liver\_avtreat=1 THEN livavt.avsg\_trust\_code

END AS livavsg\_trust\_code

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C22') AND SUBSTR(avt.stage\_best,1,1)='1' AND liver\_hes=1 AND tc.tumour\_flag=0 THEN livhes.hessg\_trust\_code

END AS livhessg\_trust\_code

---------------oesophageal---------------------------------

,CASE WHEN avt.site\_icd10\_o2\_3char IN ('C15') AND SUBSTR(avt.stage\_best,1,2)='1A' AND oesoph\_avtreat=1 THEN oesoavt.avsg\_trust\_code

END AS oesoavsg\_trust\_code

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C15') AND SUBSTR(avt.stage\_best,1,2)='1A' AND oesoph\_hes=1 AND tc.tumour\_flag=0 THEN oesohes.hessg\_trust\_code

END AS oesohessg\_trust\_code

---------------stomach---------------------------------

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C16') AND SUBSTR(avt.stage\_best,1,2)='1A' AND stomach\_avtreat=1 THEN stomavt.avsg\_trust\_code

END AS stomavsg\_trust\_code

, CASE WHEN avt.site\_icd10\_o2\_3char IN ('C16') AND SUBSTR(avt.stage\_best,1,2)='1A' AND stomach\_hes=1 AND tc.tumour\_flag=0 THEN stomhes.hessg\_trust\_code

END AS stomhessg\_trust\_code

-------------------------------------------------------------------------------

-- final join of tables with flags

-- Treatment flag tables

-- Do not flag surgery for non-ovarian C48 tumour morphologies (these are classified as "other" tumours)

FROM av2019.at\_tumour\_england@casref01 AVT

INNER JOIN analysislouisereynolds.tr\_tumour\_cohort@casref01 tc ON avt. tumourid =tc. tumourid

LEFT JOIN analysislouisereynolds.tr\_av\_ct@casref01 avct ON avt.tumourid=avct.tumourid

LEFT JOIN analysislouisereynolds.tr\_sact@casref01 sact ON avt.tumourid=sact.tumourid

LEFT JOIN analysislouisereynolds.tr\_sact\_2@casref01 sact2 ON avt.tumourid=sact2.tumourid

LEFT JOIN analysislouisereynolds.tr\_av\_rt@casref01 avrt ON avt.tumourid=avrt.tumourid

LEFT JOIN analysislouisereynolds.tr\_av\_sg@casref01 avsg ON avt.tumourid=avsg.tumourid AND (tc.tumour\_code NOT IN ('C48OTHER'))

LEFT JOIN analysislouisereynolds.tr\_rtds@casref01 rtds ON avt.tumourid=rtds.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_sg@casref01 hessg ON avt.tumourid=hessg.tumourid AND (tc.tumour\_code NOT IN ('C48OTHER'))

LEFT JOIN analysislouisereynolds.tr\_rtds\_2@casref01 rtds2 ON avt.tumourid=rtds2.tumourid

-- Add further joins for stage-specific resections:

-- add gynae tables:

LEFT JOIN analysislouisereynolds.tr\_av\_conebiops@casref01 CBAVT ON avt.tumourid=cbavt.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_conebiops@casref01 CBhes ON avt.tumourid=cbhes.tumourid

LEFT JOIN analysislouisereynolds.tr\_av\_lymph@casref01 lyavt ON avt.tumourid=lyavt.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_lymph@casref01 lyhes ON avt.tumourid=lyhes.tumourid

-- add colorectal tables:

LEFT JOIN analysislouisereynolds.tr\_av\_colorec@casref01 coloavt ON avt.tumourid=coloavt.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_colorec@casref01 colohes ON avt.tumourid=colohes.tumourid

LEFT JOIN analysislouisereynolds.tr\_av\_coloappen@casref01 coloavt\_appen ON avt.tumourid=coloavt\_appen.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_coloappen@casref01 colohes\_appen ON avt.tumourid=colohes\_appen.tumourid

-- add urological tables:

LEFT JOIN analysislouisereynolds.tr\_av\_bladder@casref01 blad1\_avt ON avt.tumourid=blad1\_avt.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_bladder@casref01 blad1\_hes ON avt.tumourid=blad1\_hes.tumourid

-- add UGI tables:

LEFT JOIN analysislouisereynolds.tr\_av\_liver@casref01 livavt ON avt.tumourid=livavt.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_liver@casref01 livhes ON avt.tumourid=livhes.tumourid

LEFT JOIN analysislouisereynolds.tr\_av\_oesoph@casref01 oesoavt ON avt.tumourid=oesoavt.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_oesoph@casref01 oesohes ON avt.tumourid=oesohes.tumourid

LEFT JOIN analysislouisereynolds.tr\_av\_stomach@casref01 stomavt ON avt.tumourid=stomavt.tumourid

LEFT JOIN analysislouisereynolds.tr\_hes\_stomach@casref01 stomhes ON avt.tumourid=stomhes.tumourid

-- Additional demographics

LEFT JOIN av2019.at\_geography\_england@casref01 atg ON avt.tumourid=atg.tumourid --join on tumour id

LEFT JOIN IMD.imd2019\_equal\_lsoas@casref01 imd ON atg.lsoa11\_code=imd.lsoa11\_code

LEFT JOIN analysisncr.lsoa\_ccg\_ca\_stp\_2019@casref01 ncr ON ncr.lsoa11cd=atg.lsoa11\_code

LEFT JOIN av2019.charlson\_2006to2019@casref01 chrl ON chrl.tumourid=avt.tumourid

LEFT JOIN (select avtu.tumourid

 , CASE WHEN avtu.stage\_best is null THEN 'X'

 WHEN (SUBSTR(avtu.stage\_best,1,1) NOT IN ('1','2','3','4')) THEN 'X'

 ELSE SUBSTR(avtu.stage\_best,1,1) END AS stage

 from av2019.at\_tumour\_england@casref01 avtu

 WHERE avtu.diagnosisyear BETWEEN 2012 AND 2019

 AND (NOT (avtu.site\_icd10\_o2\_3char='C50' AND SUBSTR(avtu.stage\_best,1,1)='0') or avtu.stage\_pi is null)

) stage\_nopagets

ON stage\_nopagets.tumourid=avt.tumourid

;

# Appendix 5: Datasets used

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Treatment type** | **Dataset** | **Data table version** | **Follow up period available** | **Linkage type** | **Data quality notes** |
| Chemotherapy | Registry data from AT\_TREATMENT\_ENGLAND | AV2019.AT\_TREATMENT\_ENGLAND@CASREF01 | Historical – September 2021  | Tumour level | Corresponds with snapshot CAS2109. |
| Chemotherapy | Systemic Anti-Cancer Therapy (SACT) 2018 | SACT\_LEGACY.PATIENT, SACT\_LEGACY.TUMOUR and SACT\_LEGACY.REGIMEN @CASREF01 | January 2013 – March 2018  | Patient and tumour level | Data was not submitted regularly from all NHS Trusts until July 2014 onwards.Regimen start date used to identify date of chemotherapy may be inaccurate for some tumours diagnosed at the start of 2013. |
| Chemotherapy | Systemic Anti-Cancer Therapy (SACT) pre-2018 | SACT.AT\_PATIENT\_ENGLAND, SACT.AT\_TUMOUR \_ENGLAND and SACT.AT\_REGIMEN \_ENGLAND@CAS2211 | April 2018 – October 2021 |  |  |
| Tumour resection | Registry data from AT\_TREATMENT\_ENGLAND | AV2019.AT\_TREATMENT\_ENGLAND@CASREF01AT\_TREATMENT\_ENGLAND | Historical – September 2021 | Tumour level | Corresponds with snapshot CAS2109. |
| Tumour resection | Inpatient Hospital Episodes Statistics (HES) 2018 | HESLIVE.HESAPC and HESLIVE.HESAPC\_OPERTN @CASREF01 | April 2000 – October 2021  | Patient level |  |
| Radiotherapy | Registry data from AT\_TREATMENT\_ENGLAND | AV2019.AT\_TREATMENT\_ENGLAND@CASREF01AT\_TREATMENT\_ENGLAND | Historical – September 2021 | Tumour level | Corresponds with snapshot CAS2109. |
| Radiotherapy | Radiotherapy Dataset (RTDS) collected by NATCANSAT, pre April 2016 | RTDS2016.RTDS\_PRESCRIPTIONS@CASREF01 | April 2009 – April 2016 | Patient level | Brachytherapy & teletherapy variable known to be inaccurate (there is over allocation to brachytherapy & underreporting of teletherapy).Data may be incomplete for selected NHS Trusts. There are known to be undercounts in RTDS in the period between mid 2015 and March 2016. |
| Radiotherapy | Radiotherapy Dataset (RTDS) collected by PHE, post April 2016 | RTDS.AT\_PRESCRIPTIONS@CAS2211  | April 2016 – January 2022 | Patient level | As above  |

#

# Appendix 6: Sensitivity analysis – impact of tumour resection code update

The list of relevant tumour resection codes was updated for SOP (v4.4) and previous versions of CAS-SOP#4, from a previous list that did not include stage-specific resections (available [here](http://www.ncin.org.uk/about_ncin/major_resections)). Please note, this analysis is from SOP (v4.4) and has not been updated for this v4.7 SOP update. Below is a comparison of the previous coding used and the current version, which includes stage-specific resections. The previous code list was applied to the current sites (selected with the same ICD10 codes), and the same timeframes obtained from this SOP.



## Findings

* For the 22 cancer sites with defined tumour resections codes, 41% of tumours had a tumour resection using the previous list of codes, and 45% had a tumour resection when using the updated list of codes, plus the site-specific additions (as listed in Appendix 3).
* Statistically significant differences between the proportions are present for all but three of the 22 sites (non-small lung cancer, small cell lung cancer and uterine cancers).
* The differences are most noticeable for bladder cancer (36% absolute difference), cervical (14% absolute difference), salivary glands (13% absolute difference), liver (13% absolute difference), and other head and neck (12% absolute difference).

# Appendix 7: Sensitivity analysis – impact of timeframe update

The timeframes as defined above may not capture all treatments for certain cancer sites (underestimate of true figure) or include treatments for recurrence (overestimate of true figure). Therefore, follow-up periods of 6/12/18 months were tested and the results are shown below. Please note, this analysis is from SOP (v4.4) and has not been updated for this v4.7 SOP update.

## This is a bar chart with the proportion of tumours recorded to have been treated with a chemotherapy by cancer type in England in 2013-2015. There are three sets of bars, one where treatments are limited to 6 months post-diagnosis, the second where treatments are limited to 12 months post-diagnosis, and the third where treatments are limited to 18 months post-diagnosis. The values for 6 months are: For all malignant (excl. nmsc) cancer: 27%,   For bladder cancer: 32%,  For breast cancer: 33%,  For cervical cancer: 33%,  For colon cancer: 30%,  For hypopharynx cancer: 41%,  For kidney cancer: 11%,  For larynx cancer: 16%,  For liver cancer: 22%,  For nsclc cancer: 25%,  For oesophagus cancer: 45%,  For oral cavity cancer: 14%,  For oropharynx cancer: 60%,  For other head and neck cancer: 30%,  For ovary cancer: 53%,  For pancreas cancer: 28%,  For prostate cancer: 2%,  For rectum cancer: 39%,  For salivary glands cancer: 6%,  For sclc cancer: 68%,  For stomach cancer: 35%,  For uterine cancer: 15%,  For vulva cancer: 7%,  For other cancer: 32%,   The values for 12 months are: For all malignant (excl. nmsc) cancer: 29%,   For bladder cancer: 34%,  For breast cancer: 34%,  For cervical cancer: 34%,  For colon cancer: 31%,  For hypopharynx cancer: 42%,  For kidney cancer: 13%,  For larynx cancer: 17%,  For liver cancer: 24%,  For nsclc cancer: 26%,  For oesophagus cancer: 46%,  For oral cavity cancer: 16%,  For oropharynx cancer: 61%,  For other head and neck cancer: 32%,  For ovary cancer: 54%,  For pancreas cancer: 29%,  For prostate cancer: 3%,  For rectum cancer: 41%,  For salivary glands cancer: 7%,  For sclc cancer: 68%,  For stomach cancer: 36%,  For uterine cancer: 16%,  For vulva cancer: 9%,  For other cancer: 34%  The values for 18 months are: all malignant (excl. nmsc) cancer: 29%,   bladder cancer: 35%,  breast cancer: 35%,  cervical cancer: 34%,  colon cancer: 32%,  hypopharynx cancer: 42%,  kidney cancer: 14%,  larynx cancer: 17%,  liver cancer: 24%,  nsclc cancer: 27%,  oesophagus cancer: 46%,  oral cavity cancer: 17%,  oropharynx cancer: 61%,  other head and neck cancer: 32%,  ovary cancer: 54%,  pancreas cancer: 29%,  prostate cancer: 4%,  rectum cancer: 42%,  salivary glands cancer: 8%,  sclc cancer: 68%,  stomach cancer: 36%,  uterine cancer: 17%,  vulva cancer: 10%,  other cancer: 35%,  Chemotherapy

## This is a bar chart with the proportion of tumours recorded to have been treated with a tumour resection by cancer type in England in 2013-2015. There are three sets of bars, one where treatments are limited to 6 months post-diagnosis, the second where treatments are limited to 12 months post-diagnosis, and the third where treatments are limited to 18 months post-diagnosis. The values for 6 months are: For all malignant (excl. nmsc) cancer: 43%,   For bladder cancer: 49%,  For breast cancer: 76%,  For cervical cancer: 53%,  For colon cancer: 66%,  For hypopharynx cancer: 28%,  For kidney cancer: 56%,  For larynx cancer: 44%,  For liver cancer: 18%,  For nsclc cancer: 16%,  For oesophagus cancer: 16%,  For oral cavity cancer: 75%,  For oropharynx cancer: 36%,  For other head and neck cancer: 33%,  For ovary cancer: 62%,  For pancreas cancer: 9%,  For prostate cancer: 14%,  For rectum cancer: 55%,  For salivary glands cancer: 75%,  For sclc cancer: 2%,  For stomach cancer: 19%,  For uterine cancer: 84%,  For vulva cancer: 77%,   The values for 12 months are: For all malignant (excl. nmsc) cancer: 45%,   For bladder cancer: 51%,  For breast cancer: 81%,  For cervical cancer: 54%,  For colon cancer: 67%,  For hypopharynx cancer: 32%,  For kidney cancer: 58%,  For larynx cancer: 46%,  For liver cancer: 20%,  For nsclc cancer: 16%,  For oesophagus cancer: 19%,  For oral cavity cancer: 75%,  For oropharynx cancer: 39%,  For other head and neck cancer: 35%,  For ovary cancer: 64%,  For pancreas cancer: 10%,  For prostate cancer: 15%,  For rectum cancer: 63%,  For salivary glands cancer: 76%,  For sclc cancer: 2%,  For stomach cancer: 22%,  For uterine cancer: 84%,  For vulva cancer: 78%,  The values for 18 months are: all malignant (excl. nmsc) cancer: 45%,   bladder cancer: 51%,  breast cancer: 81%,  cervical cancer: 54%,  colon cancer: 67%,  hypopharynx cancer: 33%,  kidney cancer: 59%,  larynx cancer: 48%,  liver cancer: 20%,  nsclc cancer: 16%,  oesophagus cancer: 19%,  oral cavity cancer: 76%,  oropharynx cancer: 40%,  other head and neck cancer: 36%,  ovary cancer: 64%,  pancreas cancer: 10%,  prostate cancer: 16%,  rectum cancer: 64%,  salivary glands cancer: 76%,  sclc cancer: 2%,  stomach cancer: 22%,  uterine cancer: 85%,  vulva cancer: 79%.Tumour Resection

## Radiotherapy



## Findings

* Overall across all sites (excluding NMSC), 27% of tumours received chemotherapy within six months of diagnosis, increasing to 29% within 12 and 18 months. Sites with the greatest absolute differences in proportions from six to 18 months are bladder, kidney, liver, oral cavity, rectum and other (3-4% absolute difference).
* Of the 22 cancer sites with defined tumour resections codes (excluding ‘Other’ sites), 43% of tumours received a tumour resection within six months of diagnosis, increasing to 45% within 12 and 18 months. Sites with the greatest absolute differences in proportions from six to 18 months are rectum, breast, hypopharynx and oropharynx (5-9% absolute difference).
* Overall across all sites (excluding NMSC), 20% of tumours received radiotherapy within six months of diagnosis, increasing to 28% within 12 months and 29% within 18 months. Sites with the greatest absolute differences in proportions from six to 18 months are breast, prostate, small cell lung cancer and oesophageal (8-26% absolute difference).